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THE USE OF ISOTOPES IN MEDICAL RESEARCH

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The word isotope refers to forms of the same element having different atomic weights. For example, there are five isotopes of ordinary iron in nature, and a preparation of iron used therapeutically contains these different isotopes in the following percentages:

Fe^{54}	6.04%	Fe^{57}	2.11%
Fe^{56}	91.57%	Fe^{58}	0.28%

All have the same nuclear charge, which means that they are iron, but each has a different total atomic weight. Similarly, other elements have different isotopic forms. For instance, there is hydrogen, with atomic weight 1; and heavy hydrogen, with atomic weight 2, which is twice as heavy. Hydrogen in nature contains 99.98 per cent H^1 and 0.02 per cent H^2. Other examples are nitrogen, with two isotopes, N^{14} (99.62 per cent), and N^{15} (0.38 per cent) and carbon, with two isotopes C^{12} (98.9 per cent) and C^{13} (1.1 per cent). In a given chemical or biologic sample, the percentage of these isotopes in the material can be determined by use of the mass spectrograph; and by employing compounds containing enriched percentages of a particular isotope, one can trace an element or compounds of that element in a biologic process. In the mass spectrograph the ionized atoms of different weights are accelerated in a magnetic field, which causes them to travel in a circular path, the radius of which depends on the mass of the particular particle. The collecting plate accumulates the charges brought to it, and the amount of the particular isotope is determined from this value. Important and extensive biologic, biochemical and medical research have been done with this tracer technic, particularly with N^{15} and C^{13}.[1]

There is another type of isotope, which I would like to discuss in somewhat more detail. This is the radioactive isotope. In addition to having different atomic weights, these isotopes emit rays of various tvpes, somewhat like the rays emitted by radium and its decay products. The quantity of the isotope present can be determined by use of a Geiger counter, electroscope or electrometer, which count or measure the number of rays emitted per unit time. With methods now available radioactive forms of nearly all the ninety-six elements now known in the periodic system can be made artificially. The most efficient methods involve the use of the cyclotron or the uranium pile.[2]

In the cyclotron positively charged nuclear particles are accelerated. For example, if radioactive iodine is to be made, a target of the element tellurium (which is next to iodine in the periodic table) may be bombarded with deuterons. The result is the transformation of some of the tellurium atoms into I^{131}, a radioactive isotope which emits beta and gamma rays. The reaction may be written as follows:

$$_{52}Te^{130} + {}_1H^2 \longrightarrow {}_{53}I^{131} + {}_0n^1$$

tellurium + deuteron ⟶ iodine (radioactive) + neutron

Some of the transmutations that can be effected with the cyclotron may also be produced by the pile, and in many of these cases the pile is able to make larger quantities of isotope than is the cyclotron. For example, ordinary N^{14} can be converted into long-lived radioactive C^{14}. The reaction is as follows:

$$_7N^{14} + {}_0n^1 \longrightarrow {}_6C^{14} + {}_1H^1$$

Here, the target is nitrogen in the form of some compound of nitrogen, such as ammonium nitrate. The bombarding bullet is a slow neutron, and a pile is the source par excellence for slow neutrons. The nitrogen nucleus gains a neutron but loses a proton and thus is transformed to carbon of atomic weight 14.

There are two obvious uses for these new isotopes: one as a source of therapeutic irradiation in substitution for roentgen rays and radium and the other as tracers in metabolic studies. These elements and compounds made from them or containing them are chemically like their inactive relatives. Since they emit rays, they can be followed in the organism and a dynamic picture of metabolism can be obtained. Only one in several million atoms need be labeled with activity to enable all of them, including the nonactive atoms, to be followed.

In tracer work extremely weak activities of the elements are used so that there is no biologic effect from the irradiation. There is a so-called safe human tolerance level for irradiation (0.1 roentgen per day), and in tracer work one attempts to keep below this level. In their every day environment all persons are exposed, from cosmic rays and the radiations from the naturally occurring radioactive substances in the earth, to a small daily dose of irradiation. In therapeutic work, in contrast to tracer work, larger doses are used.

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In figure 1 are listed a number of radioactive isotopes which have been used in biologic and medical research. As with all unstable atoms, each isotope emits a characteristic type of radiation and has a definite half-life. The half-life is the time required for the sample to decay to one-half its original activity. There is H^3, radioactive hydrogen, which has a half-life of 31 years. There are two medically useful [3] radioactive isotopes of carbon, C^{11} and C^{14}, the former with

ISOTOPE	RADIATION	HALF-LIFE	ENERGY OF PARTICLES MEV	γ RAYS MEV
$_1H^3$	β^-	31 yrs.	0.015	
$_6C^{11}$	β^+	20.5 min.	0.95	
$_6C^{14}$	β^-	25×10^3 yrs.	0.145	No γ
$_{11}Na^{22}$	β^+, γ	3.0 yrs.	0.58	1.3
$_{11}Na^{24}$	β^-, γ	14.8 hr	1.4	1.4, 2.8; 2.67; 2.69; 3.22, 3.61
$_{15}P^{32}$	β^-	14.30 days	1.71	No γ
$_{16}S^{35}$	β^-	87.1 days	0.120	
$_{20}Ca^{45}$	β^-, γ	180 days	0.2, 0.9	0.7
$_{26}Fe^{59}$	β^-, γ	47 days	0.26, 0.46	1.10, 1.30
$_{36}Kr^{79,81}$	β^+	34 hr.	0.4	
$_{38}Sr^{89}$	β^-	55 days	1.50; 1.32	No γ
$_{53}I^{131}$	β^-, γ	8.0 days	0.687; 0.595	0.4; 0.367, 0.080
$_{54}Xe^{127}$	e^-, γ	34 days		0.9
$_7N^{13}$	β^+, γ	9.93 min.	0.92, 1.20	0.28
$_{17}Cl^{34}$	β^+	33 min	2.5	
$_{18}A^{37}$		34 days		
$_{18}A^{41}$	β^-, γ	110 min.	1.5	1.37
$_{19}K^{42}$	β^-	12.4 hr.	3.5	
$_{20}Ca^{47}$	K, γ, e^-	8.5 days		1.1
$_{29}Cu^{64}$	$\beta^-; \beta^+; K$	12.8 hr.	0.58, 0.66	No γ
$_{30}Zn^{65}$	β^+, K, γ, e^-	250 days	0.4	0.45, 0.65, 1.0; 1.14
$_{35}Br^{80}$	$I.T., e^-, \gamma$	4.4 hr.		0.049, 0.037 or 0.025, 0.037
$_{35}Br^{82}$	β^-, γ	34 hr	0.465	0.547, 0.787, 1.35
$_{54}Ba^{133}$	$I.T., e^-, \gamma$	38.8 hr		0.30; 0.276
$_{78}Pt^{197}$	β^-, γ	3.3 days		
$_{79}Au^{196}$	β^-, γ, e^-	4.5 days	0.36	0.41
$_{79}Au^{198}$	β^-, γ	2.7 days	0.8; 0.78	0.28, 0.44, 2.5
$_{80}Hg^{203,205}$	β^-, γ	51.5 days	0.46	0.30
$_{82}RaD^{210}$	β^-, γ	22 yrs.	0.0255	0.047
$_{83}RaE^{210}$	β^-	5.0 days	1.17	
$_{84}Po^{210}$	α, γ	140 days	5.298	
$_{85}85^{211}$	α, K	7.5 hr.	5.94	
$_{86}Rn^{222}$	α	3.825 days	5.486	
$_{88}Ra^{226}$	α, γ	1590 yrs.	4.791	0.19
$_{90}Th^{232}$	α	1.39×10^{10} yrs.	4.20	
$_{92}AcU^{235}$	α	7.07×10^8 yrs.		
$_{92}U_I^{238}$	α	4.51×10^9 yrs.	4.15; 4.23; 4.21	
$_{94}Pt$	α			

Fig. 1.—Partially complete list of artificial and natural radioactive elements. Radiation symbols are: β^- or β^+, negative or positive electrons emitted from the nucleus; γ, gamma rays; e^-, internal conversion electron; k, x-ray, and *I.T.*, isomeric transition.

a half-life of about twenty-one minutes and the latter with one of about 6,000 years. The former has been used in medical studies [3] in which experiments must be completed within a few hours because of the rapid loss of activity. With carbon of atomic weight 14 there is no appreciable decay during a human lifetime. Farther down the list are seen two isotopes of sodium, and one of phosphorus, also one of sulfur, calcium, iron, iodine and potassium—all with different half-lives and all of interest in physiology and medicine. The last few elements are those which occur in nature, as does radium. It has a half-life of almost 1,600 years. Another interesting natural radioactive element is uranium 235, which has a half-life of almost a billion years and is used in one of the atomic bombs. Element 94 is plutonium, which is made artificially from uranium (although it occurs in minute amounts in nature); it is the essential ingredient of another type of atomic bomb.

In the consideration of the applications of these elements in research problems, first, examples can be given of several technics which have been developed. With the autoradiographic technic the animal or plant may be given a single dose of the tracer material, and at various periods thereafter tissues are sectioned and placed against photographic film for short periods of time.. Then the film is developed. Figure 2 shows how one can visually demonstrate the location of a gas in the tissues. Here, a thin, frozen cross section of a rat has been placed against a film after the rat has been breathing a mixture of oxygen and radioactive krypton. This latter gas, like nitrogen, is quite soluble in fat, and the autoradiograph shows that the spinal cord and perirenal fat have taken up relatively large amounts of the gas. In the case of the cord the high uptake is presumably related to phospholipid content. The white area around the cord represents a cross section of a vertebra. Here, there has been no uptake of the gas.[4] Two other radioactive isotopes have been used in some interesting autoradiographic studies by Axelrod and Hamilton.[5] They obtained mustard gas which contained radioactive sulfur in its structure and lewisite gas which contained radioactive arsenic. These labeled gases were painted on a small area of normal skin, sufficient to cause vesication, and then a biopsy specimen of the skin was taken. Sections were made and autoradiographed. Comparative studies of the stained sections and the autoradiographs revealed that, although both gases are deposited in the skin, mustard was chiefly in the corium while lewisite was seen more in the epidermis and hair follicles.[5]

The second and most widely used technic is the in vitro method. In this case samples of material, such as blood, spinal fluid, urine, stools or tissues, taken at various periods of time after administration of the radioactive material are weighed, ashed and measured for activity. Perhaps the most interesting work with this technic has been that of several groups of investigators using radioactive iron in studies on the absorption of different compounds of iron by various routes and on methods for the preservation of whole blood. The development of the whole blood preservative, anticoagulant acid citrate dextrose solution (ACD), was greatly facilitated by the use of red cells labeled with radioactive iron; [6] and it has been shown that ferrous iron given therapeutically is more completely absorbed

3. Tobias, C. A.; Lawrence, J. H.; Roughton, F. J. W.; Root, W. S., and Gregersen, M. I.: The Elimination of Carbon Monoxide from the Human Body with Reference to the Possible Conversion of CO to CO_2, Am. J. Physiol. **145**: 253-263 (Dec.) 1945.

4. Lawrence, J. H.; Turpin, F. H.; Loomis, W. F.; Jones, H. B., and Tobias, C. A.: Preliminary Observations on the Narcotic Effect of Xenon with a Review of Values for Solubilities of Gases in Water and Oils, J. Physiol. **105**: 197-204, 1946.

5. Axelrod, D. J., and Hamilton, J. G.: Radioautographic Studies of the Distribution of Lewisite and Mustard Gas in Skin and Eye Tissues, Am. J. Path., to be published.

6. Gibson, J. G., II; Aub, J. C., and Evans, R. D.: The Circulatory Response to Therapeutic Measures, Including Blood Substitutes and Preserved Red Cells, in Experimental Shock. Development of Methods of Preserving and Storing Red Cells or Whole Blood for Transfusion, and Evaluation of Such Methods by Means of Measuring Survival of Cells After Transfusion by Means of Radioactive Iron, Committee on Medical Research, Report no. 131 (Shock Report no. 51), July 15, 1944. This report may be obtained by writing to the Office of the Publication Board, Department of Commerce, Washington 25, D. C.

than the ferric form.[7] Figure 3 shows the use of the second technic in some studies on mice in which the objective was to determine the tracer dose versus the biologically destructive dose of radioactive phosphorus.[8] Tissues taken after killing each animal were weighed and extracted for various phosphorus-containing fractions, and the extracts were measured for activity. Curves for the synthesis of various compounds containing phosphorus were obtained. These showed the inhibition of synthesis by the larger dose of P^{32} used.

The final technic is the in vivo method, in which the counter measures the uptake at local areas of the body. For instance, one can pass the counter tube over the surface of an animal that has received a radioactive compound localizing in a certain viscus, tumor or gland and note an increase in counting rate when the particular tissue is approached. Similarly, this technic has been used to measure the time required for the blood in a normal person to reach the heart from the arm after the injection into the antecubital vein of a small amount of radioactive sodium chloride in isotonic solution.

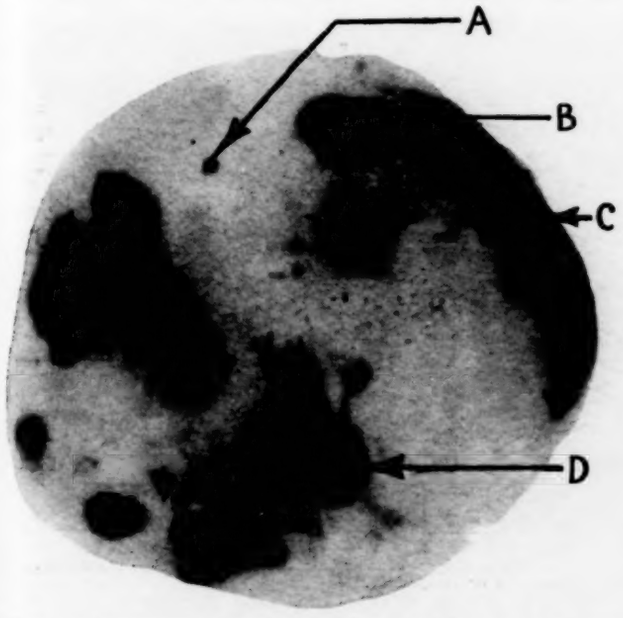

Fig. 2.—Autoradiograph showing localization of the isotope in cross section of rat previously exposed to atmosphere containing radioactive krypton. *A*, spinal cord; *B*, perirenal fat; *C*, gas trapped in hair, and *D*, mesenteric fat.

Again, thyroid metabolism has been studied subsequent to the administration of radioactive iodine: the counter tube is placed over the gland, and the uptake curve is determined and found to vary for different types of thyroid abnormality.[9] Circulation to the extremities may be studied by using intravenously injected radioactive sodium chloride or by inhaling one of the radioactive gases (figs. 4 and 5).[10] This technic is now finding use in association with skin temperature measurements in studies of vascular disease. The adequacy of the circulation can be estimated by this technic, and therapeutic measures can be evaluated. Figure 7 shows how one can measure the uptake and movement of a labeled compound in mouse tumors by the in vivo

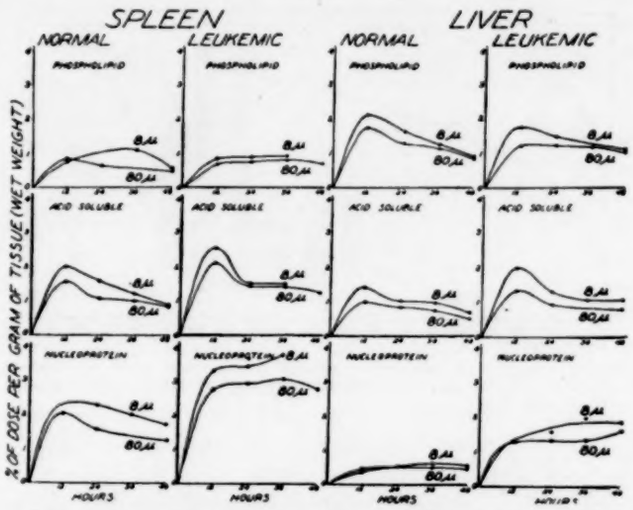

Fig. 3.—The comparable retention of radioactive phosphorus in fractions of tissues and carcasses of normal and leukemic animals twelve, twenty-four, thirty-six and forty-eight hours following the intraperitoneal administration of P^{32} emitting both 8 and 80 microcuries of beta radiation per mouse. (From Tuttle, Erf and Lawrence.[8])

technic, as developed by Strajman.[11] The Geiger counter tube is long and narrow and can be inserted into the rectum or vagina for similar studies. One final example is shown in some recent investigations with carbon of atomic weight 11, the twenty-one minute half-life isotope.[3] The problem presented by the Navy was this. Why, after the inhalation of a definite amount of carbon monoxide, is it possible to recover only 60 per cent of it during the early periods after inhalation?[12] Is this unrecoverable carbon monoxide oxidized to carbon dioxide by the body, or does it go somewhere other than to hemoglobin? To answer this question radioactive carbon monoxide was employed, mixing it with ordinary carbon monoxide (150 cc. in 1,000 cc. of oxygen) in a Douglas bag. After inhalation the carboxyhemoglobin level of the subjects was raised significantly. While breathing oxygen all exhaled carbon dioxide was collected in soda lime and measured for radioactivity. There was no activity in any of the soda lime; hence, it was proved that the body does not oxidize carbon monoxide to form carbon dioxide. What had happened to the carbon monoxide? Counters were then placed over various parts of the body, and

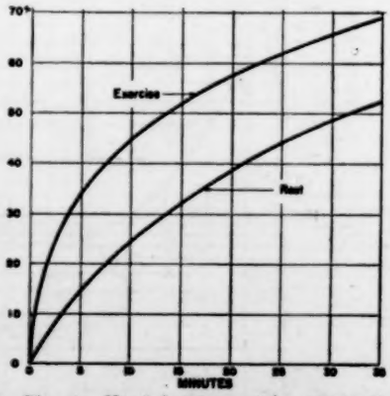

Fig. 4.—Hand-krypton uptake curves at rest and after ten minutes of strenuous exercise by subject aged 25.

7. Hahn, P. F.; Jones, E.; Lowe, R. C.; Meneely, G. R., and Peacock, W.: The Relative Absorption and Utilization of Ferrous and Ferric Iron in Anemia as Determined with the Radioactive Isotope, Am. J. Physiol. **143:** 191-197 (Feb. 1) 1945. Moore, C. V.; Dubach, R.; Mennick, V., and Roberts, H. K.: Absorption of Ferrous and Ferric Radioactive Iron by Human Subjects and by Dogs, J. Clin. Investigation **23:** 755-767 (Sept.) 1944.

8. Lawrence, J. H.; Tuttle, L. W., and Erf, L. A.: Studies on Neoplasms with the Aid of Radioactive Phosphorus: III. The Phosphorus Metabolism of the Phospholipid, Acid Soluble and Nucleoprotein Fractions of Various Tissues of Normal and Leukemic Mice Following the Administration of Tracer and Therapeutic Doses of Radio-Phosphorus, J. Clin. Investigation **20:** 577-581 (Sept.) 1941.

9. Hamilton, J. G.: The Use of Radioactive Tracers in Biology and Medicine, Radiology **39:** 541-572 (Nov.) 1942.

10. Smith, B. C., and Quimby, E. H.: The Use of Radioactive Sodium as a Tracer in the Study of Peripheral Vascular Disease, Radiology **45:** 335-346 (Oct.) 1946. Tobias, C. A.; Lawrence, J. H., and Hamilton, J. G.: The Measurement of Circulation to the Extremities with Radioactive Inert Gases, to be published.

11. Strajman, E.: Small Mica Window Geiger-Muller Counter for Measurements of Radioactive Isotopes in Vivo, Rev. Scient. Instruments **17:** 232-234 (June) 1946.

12. Roughton, F. J. W., and Root, W. S.: The Fate of CO in the Body During Recovery from Mild Carbon Monoxide Poisoning in Man, Am. J Physiol. **145:** 239-252 (Dec.) 1945.

figure 6 presents the rate of disappearance of carbon monoxide from the thigh and from the liver as meaured by a counter placed over these areas. The thigh disappearance rate corresponded to the disappearance rate of carbon monoxide from samples of blood taken from the antecubital vein; this was expected. But the

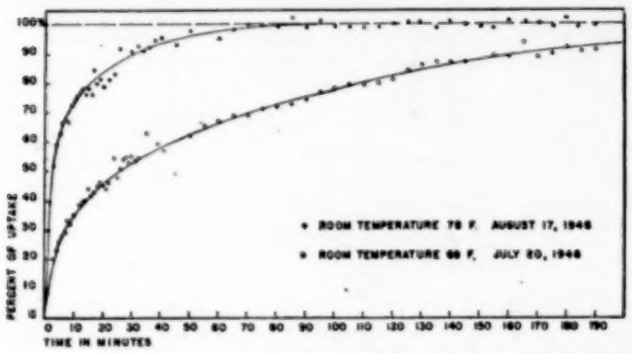

Fig. 5.—Uptake of radioactive sodium in the right hand of subject E. E. at 68 F. and at 78 F. ambient temperature under basal metabolic conditions (G. B.).

other curve is the interesting one, that is, the curve obtained with the counter placed over the liver. It starts high and only gradually approaches the slope of the thigh curve, indicating that the liver has possibly "gobbled up" a large fraction of the carbon monoxide, as the blood carries a large amount through it, later releasing the carbon monoxide to the blood stream, from which it is eliminated by the lungs. Later experiments, in which all exhaled air was collected for several

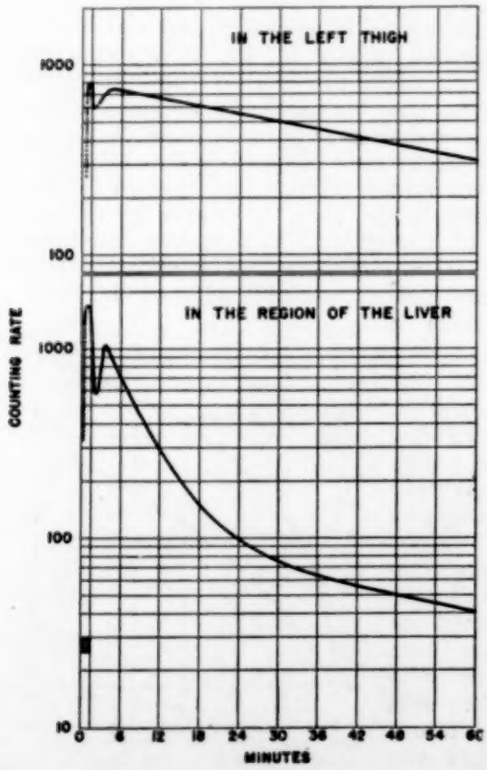

Fig. 6.—Decrease in the amount of C* while breathing oxygen and after one and a half minutes of inhaling C*O. (The asterisk indicates radioactive carbon.)

hours in 3 subjects, showed that nearly 100 per cent of all carbon monoxide taken from the Douglas bag was eventually recovered in the exhaled breath;[12] thus the liver eventually releases its carbon monoxide. These results, from the clinical point of view, throw further doubt on the reliability of using carbon monoxide for blood volume determinations, whether the retention of carbon monoxide by the liver is due to "gobbling" or to a circulatory phenomenon.

Finally, the selective localization of certain compounds or elements in tissues has led to some therapeutic applications of the artificially made radioactive isotopes. The thyroid gland selectively absorbs iodine and constitutes the best example of selective localization. Actually the concentration of the iodine atoms in the gland may be several hundred times that in any of the other normal tissues, and Hamilton and Soley and their associates have shown that it is possible with larger doses in rabbits to remove their thyroid glands by this slow selective irradiation without damage to other normal tissues.[9] These and other studies have led to the successful use of radioactive iodine in the therapy of hyperplastic thyroid disease by several groups of investigators.[13] It has been found that certain cases of cancer of the thyroid concentrate radioactive iodine, and Marinelli and his associates[14] have successfully treated a patient with carcinoma of the thyroid, which had metastasized to

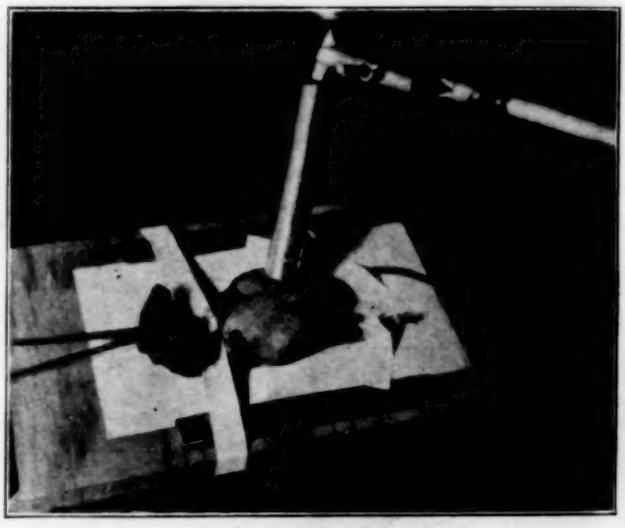

Fig. 7.—Small Geiger counter for in vivo study of metabolism of labeled elements or compounds.[11]

bone, through the use of radioactive iodine. The patient was extremely ill, and emaciated but now, after three years, has gained weight, is up and around and enjoying normal life. This demonstrates what can be done through selective localization and irradiation.

Figure 8 again shows selective localization, this time of a colloidal radioactive compound first used by Jones, Wrobel and Lyons in the liver and spleen, and this is clearly seen by comparing the section and the autoradiograph.[15] There is clouding of the film only in the regions of the liver and spleen. This, again, is genuine selective localization. The therapeutic use of isotopes is based on such selective localization.

Since 1936,[16] radioactive phosphorus in the form of sodium hydrogen phosphate has been used in the treat-

13. Hamilton, J. G., and Lawrence, J. H.: Recent Clinical Developments in the Therapeutic Applications of Radiophosphorus and Radioiodine, J. Clin. Investigation **21**: 624 (Sept.) 1942. Hertz, S., and Roberts, A.: Application of Radioactive Iodine in Therapy of Graves' Disease, ibid. **21**: 624 (Sept.) 1942. Chapman, E. M., and Evans, R.: Radioactive Iodine in Hyperthyroidism, J. A. M. A. **131**: 86-91 (May 11) 1946.

14. Seidlin, S. M.; Marinelli, L. D., and Oshry, E.: Radioactive Iodine Therapy, J. A. M. A. **132**: 838-846 (Dec. 7) 1946.

15. Jones, H. B.; Wrobel, C. J., and Lyons, W. R.: A Method of Distributing Beta-Radiation to the Reticulo-Endothelial System and Adjacent Tissues, J. Clin. Investigation **23**: 783-788 (Sept.) 1944.

16. Lawrence, J. H.: Nuclear Physics and Therapy: Preliminary Report on a New Method for the Treatment of Leukemia and Polycythemia, Radiology **35**: 51-59 (July) 1940.

ment of chronic leukemia and polycythemia vera. The use of radioactive phosphorus (P^{32}) in these diseases is based on the fact that in leukemic tissue and in the bone marrow there is some degree of selective localization; therefore, selective irradiation is the result. However, the degree of selective irradiation is not great, and the irradiation delivered to the abnormal tissues with reference to the normal tissues is not so great as would be desirable. The limitations of this form of therapy, particularly in the case of leukemia, has been brought out in a recent article.[17] In evaluating any new form of therapy the questions every one asks are "Does the treatment cure the disease?" and "Is comfortable life prolonged?" In the use of radioactive phosphorus for leukemia several groups of investigators have demonstrated that remissions can be produced without any complicating radiation sickness.[18] All reports have expressed the belief that this form of therapy is as good as, and possibly better than, roentgen radiation, but none has answered the preceding questions. Its one definite advantage is the lack of irradiation sickness. Another five years at least must elapse before the final evaluation can be made of any large series with reference to length of life after onset, but in a forthcoming paper there will be a preliminary detailed analysis of such a large series.[19] In this work the use of radioactive phosphorus (P^{32}) was considered to be a form of whole-body

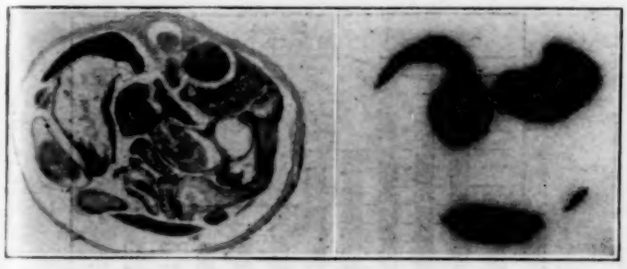

Fig. 8.—Cross section of mouse showing selective localization of chromic radioactive phosphate in the liver and spleen.

spray therapy with some slight localization in the leukemic tissue. Consequently, when spray therapy was not considered to be needed and when it was believed that local roentgen radiation to the spleen, liver and lymph nodes was indicated, such local therapy was given, but usually after a course of P^{32} had been administered. However, in the whole group many patients were treated with this isotope alone. Other supportive measures, such as transfusions and the administration of iron and liver preparations, were used as indicated. In other words, all patients in this series were not treated with radioactive phosphorus alone. Some of them received local roentgen radiation in addition. The patients were not selected, and all those treated from the very beginning have been included. As a group, these patients are apparently not representative of those with average chronic leukemia but are an unfavorable group, since many of them were failing to respond to standard methods of therapy and then were referred to us.[19] Of this latter impression one cannot be certain, however.

Figure 9 presents the results in the first 98 cases of chronic myelogenous leukemia. The duration of life is from the time of onset until death. The time of onset was determined from the appearance of the first symptom or sign that could definitely be related to the leukemic process, as proved either at the time or a

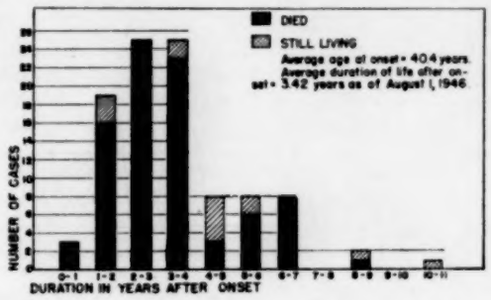
DIED
STILL LIVING
Average age at onset = 40.4 years.
Average duration of life after onset = 3.42 years as of August 1, 1946
NUMBER OF CASES
DURATION IN YEARS AFTER ONSET

Fig. 9.—Results in the first 98 cases of chronic myelogenous leukemia treated with radioactive phosphorus.

short time later. In the determination of this time of onset, an effort was made to err on the side of favoring a short duration. All the patients have been seen by at least three physicians in the clinic. A glance at figure 9 shows that radioactive phosphorus (P^{32}) is far from the answer to the problem of chronic myelogenous leukemia, but the average length of life compares favorably with other reported series, and some of the patients are still living.[20] The 2 patients living at 8-9 years and 10-11 years have been treated with radioactive

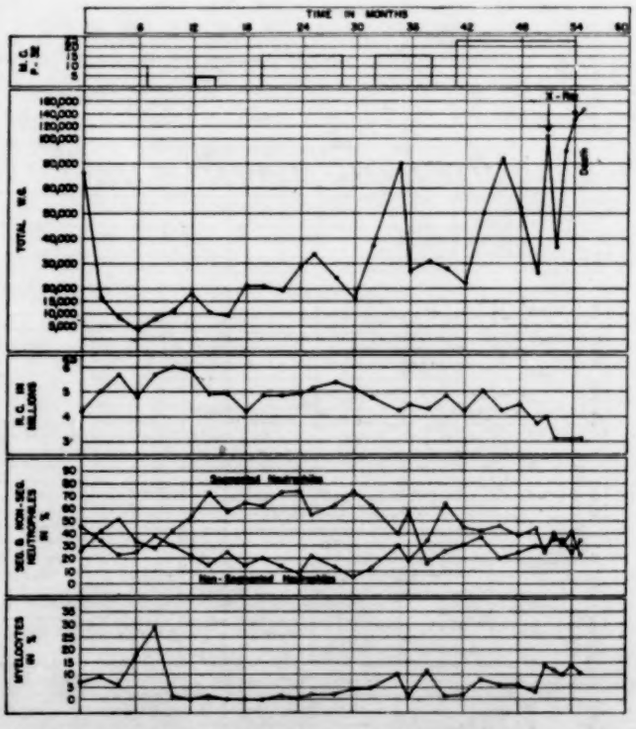

Fig. 10.—Hematologic response to P^{32}. The patient, J. M., a woman aged 55, with chronic myelogenous leukemia, who received four and a half years of P^{32} therapy preceded by two years of roentgen radiation, was kept in good condition for several years but eventually failed to respond to the further administration of the isotope. Total millicuries in divided doses and extent of time over which they were given is indicated at the top.

phosphorus only. Thus, this preliminary analysis shows that in addition to the other advantages of treatment

17. Graff, W. S.; Scott, K. G., and Lawrence, J. H.: The Histologic Effects of Radiophosphorus on Normal and Lymphomatous Mice, Am. J. Roentgenol. **55**: 44-54 (Jan.) 1946.

18. (*a*) Reinhard, E. H.; Moore, C. V.; Bierbaum, O. S., and Moore, S.: Radioactive Phosphorus as a Therapeutic Agent, J. Lab. & Clin. Med. **31**: 107-218 (Feb.) 1946. (*b*) Warren, S.: The Therapeutic Use of Radioactive Phosphorus, Am. J. M. Sc. **209**: 701-711 (June) 1945. (*c*) Saralegui, J. A., and Pavlovsky, A.: Tratamiento de las leucemias con el fosforo radioactivo, Radiologia **6**: 88 (May-June) 1943.

19. Lawrence, J. H.; Low-Beer, B. V. A.; Brown, B. R.; Stone, R. S., and Dobson, R. L.: Results in the Radiation Therapy of Leukemia, to be published.

20. Minot, G. R.; Buckman, T. E., and Isaacs, R.: Chronic Myelogenous Leukemia: Age Incidence, Duration, and Benefit Derived from Irradiation, J. A. M. A. **82**: 1489-1494 (May 10) 1924. Craver, L. F.: Treatment of Leukemia by Radioactive Phosphorus, Bull. New York Acad. Med. **18**: 254-262 (April) 1942.

with radioactive phosphorus previously discussed by numerous writers, the length of life after onset is as long as that after other methods of therapy and may prove

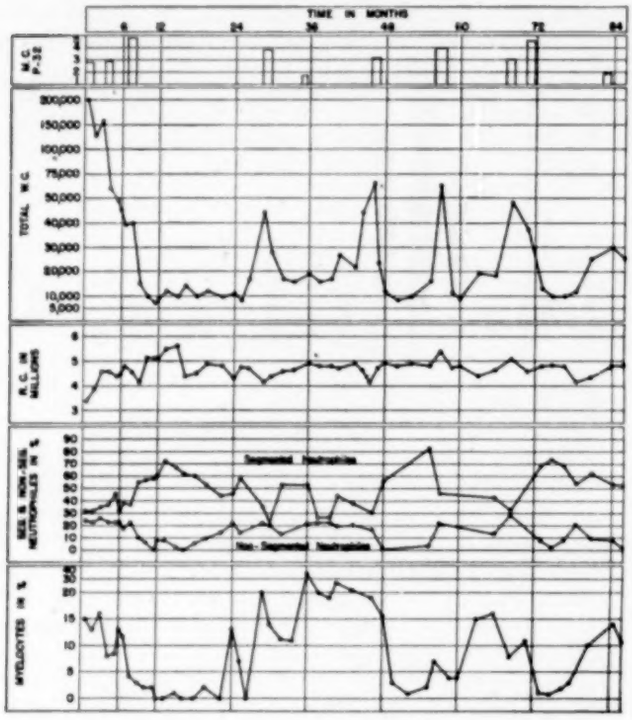

Fig. 11.—An unusual response to P^{32}. This patient, C. K., a man now 35 years of age, has continued for over eight years to respond to infrequently administered radioactive phosphorus. He has never received roentgen radiation or other forms of therapy for chronic myelogenous leukemia.

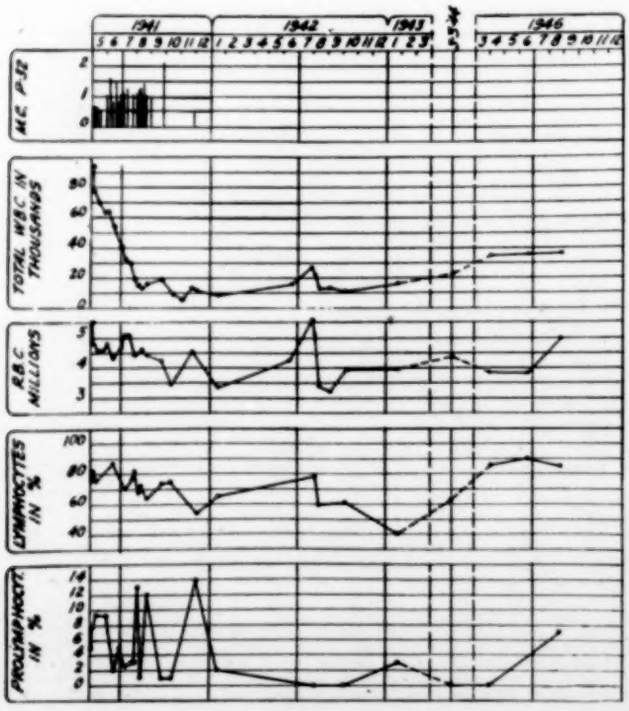

Fig 12.—Hematologic response during fifty-one months of intermittent radioactive phosphorus therapy in patient M. P., a woman aged 59, with chronic lymphatic leukemia. This patient has had no treatment since 1941.

to be somewhat longer. The typical reaction to this therapy and an unusual reaction to therapy are shown in figures 10 and 11.

In figure 13 are summarized the results in chronic lymphatic leukemia. Here, the series is smaller and the statistics are less valuable. Also, 2 patients who had the disease for several years prior to treatment with P^{32} are in the group, and they raise the figure for the average length of life after onset. Nevertheless, the results are good according to present criteria for the evaluation of the treatment of chronic lymphatic leukemia by standard methods.[21] Figure 12 shows the reaction to P^{32} in 1 patient with lymphatic leukemia. From ten years of experience in the use of radioactive phosphorus in chronic leukemia the impression has been gained that if radioactive compounds can be made to localize more selectively in leukemic tissue improved results from radiation therapy may follow. Some of the radioactive colloids have possibilities in this direction and are now under trial.

In forthcoming publications therapeutic and other investigations of a large number of patients suffering from polycythemia vera will be discussed in detail. The first patients were treated in 1939,[16] and numerous investigators [22] have confirmed the fact that with radioactive phosphorus, administered in small doses and infrequently, it is usually possible to control the polycythemia and the symptoms which result from it. As shown in figures 14 and 15, repetition of therapy may

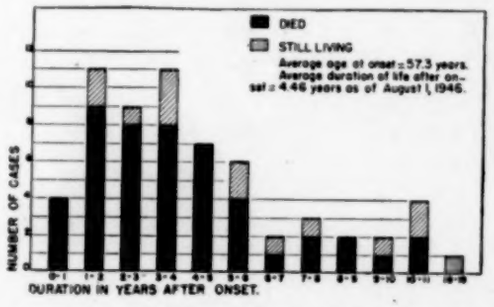
DIED
STILL LIVING
Average age of onset = 57.3 years.
Average duration of life after onset = 4.46 years as of August 1, 1946.
NUMBER OF CASES
DURATION IN YEARS AFTER ONSET.

Fig. 13.—Results in treatment of chronic lymphatic leukemia with radioactive phosphorus.

not be necessary for many years after the first course of treatment. Other than complicating disease, the chief causes of death in polycythemia vera have been: leukemia; thromboses, such as portal, coronary or cerebral, and a terminal anemia in the spent phase of the disease. There may be other intercurrent disease, such as infections, arteriosclerotic complications or neoplasms, particularly in the older patients. During the period 1939 to 1946 74 patients with polycythemia vera have been treated with radioactive phosphorus. Some of these had been previously treated by venesection, phenylhydrazine or roentgen radiation. The average age at onset of first symptoms of the disease was 48 years. The life expectancy at age 48 is about twenty-four years.[23] Since the initiation of the use of radioactive phosphorus there have been 10 deaths in the whole group from various causes, at an average age of 69, which is not far from the normal life expectancy, i. e.,

21. Minot, G. R., and Isaacs, R.: Lymphatic Leukemia: Age Incidence, Duration, and Benefit Derived from Irradiation, Boston M. & S. J. **191**: 1-9 (July 3) 1924.

22. (*a*) Erf, L. A., and Jones, H. W.: Radio-Phosphorus: An Agent for the Satisfactory Treatment of Polycythemia and Its Associated Manifestations; a Report of a Case of Polycythemia Secondary Possibly to the Banti's Syndrome, Ann. Int. Med. **19**: 587-601 (Oct.) 1943. (*b*) Hall, B. E.; Watkins, C. H.; Hargraves, M. M., and Giffin, H. Z.: Radioactive Phosphorus in the Treatment of Polycythemia Vera: Results and Hematologic Complications, Am. J. M. Sc. **209**: 712-717 (June) 1945. (*c*) Reinhard, Moore, Bierbaum and Moore.[18a] Warren.[18b]

23. The Final Phase in the Conquest of Tuberculosis, Statist. Bull. Metrop. Life Insur. Co. no. 4 **26**: 1 (April) 1945.

twenty-one years instead of twenty-four years. The small number of cases, however, does not permit one to attach much significance to this figure; also several of the patients had previously been treated by methods other than the use of radioactive phosphorus. Perhaps one can hope that, in controlled polycythemia vera, a near-normal life expectancy may be reached. As has been pointed out previously, thromboses, leukemia and anemia are common complications of the disease, and the life expectancy in polycythemia is probably not over ten years on the average, although exhaustive search of the literature does not reveal the life expectancy in this disease, whether treated or untreated. In a series of 163 patients treated by other methods, 36 were reported to have lived longer than five years, and in about 17 per cent of the whole group there developed leukemia.[24] In the radioactive phosphorus series, 3 have died of leukemia. These were patients whose disease was of long standing and who had been treated previously with phenylhydrazine, roentgen radiation or venesection.

There is one other example of selective localization in therapy in which a radioactive element is being used. This is P^{32} in the treatment of skin cancer.[25] The localization is accomplished by soaking a piece of absorbent paper, such as blotting paper, with the desired amount of beta-ray-emitting radioactive phosphorus and applying it to the lesion for the calculated length of time. In this way the predetermined dose in roentgens of superficial irradiation is delivered during the following several hours or days; and since the beta rays penetrate less than 1 cm., most of the irradiation is delivered to the neoplastic cells and not to the deeper, uninvolved tissues.

In conclusion, these nonradioactive isotopes, such as N^{15} and C^{13}, and the radioactive ones provide the investigator with a valuable method for metabolic studies. There is a rich field of investigation with labeled hormones, antibodies, amino acids, antibiotics and other biologically important compounds, and our colleagues in the field of chemistry are now very active in this direction.[26] In the therapeutic field, if compounds containing radioactive elements emitting radiations which traverse only short distances and which localize to a high degree in neoplastic tissue can be found, important advances may be made. The localization of radioactive iodine in the hyperplastic thyroid is the best example of such localization at present. Recently much has been read of the atomic bomb and the uranium pile, and it is often inferred that these new developments are going to revolutionize medical research and even therapy and that the cancer problem soon may be solved with their aid. It is important, however, to keep in mind that there have been available from the cyclotron the various radioactive isotopes for biologic and medical research for over ten years; that is, since 1934. They have already facilitated numerous important contributions in medical investigation and will continue to do so; but one must not expect them suddenly to solve the cancer problem. In the development of the atomic bomb and the uranium pile most of the fundamental research which made the atomic bomb nearly a certainty in time had been carried out prior to 1939. In the case of the cancer problem this fundamental research has yet to be done. However, a continued stream of contributions can be expected now that isotopes will be widely available for experimental investigation. For animal studies and for certain clinical studies their careful use by competent workers is justified and indeed urgently indicated.

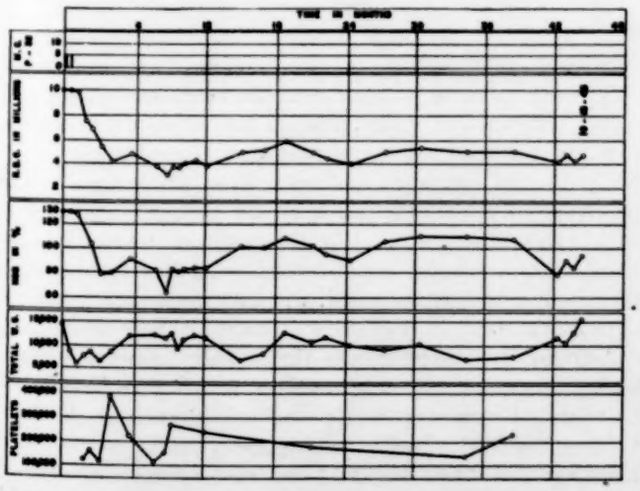

Fig. 14.—Hematologic response to two injections of radioactive phosphorus. This patient, L. J., a woman aged 36, with an enlarged spleen and typical polycythemia vera, which had not previously been treated, continues normal after five years, without further therapy.

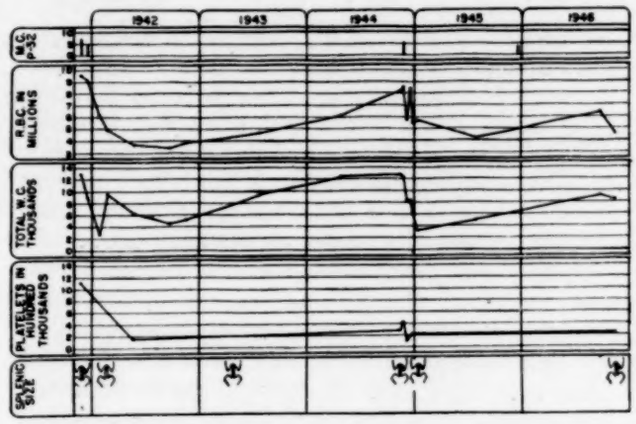

Fig. 15.—Patient M. J. M., a man aged 56, with polycythemia vera of one year's duration, treated in 1942, had a recurrence of symptoms and signs and was retreated in 1944.

ADDENDUM

It is assumed that physicians are aware that, as in the case of roentgen rays and radium, there are certain health hazards to both physician and patient when working with artificial radioactivity,[27] unless working conditions are carefully controlled, and unless dosage to the patient is also carefully controlled. Excessive dosage or long-continued administration of smaller doses may produce serious delayed effects. When individuals or groups begin to use these radioactive materials in the laboratory or clinic, it is important that they have the advice of and periodic checks by a physicist and a physician.

24. Tinney, W. S.; Hall, B. E., and Giffin, H. Z.: The Prognosis of Polycythemia Vera, Proc. Staff Meet., Mayo Clin. **20:** 306-310 (Aug. 22) 1945; Hematologic Complications of Polycythemia Vera, ibid. **18:** 227-230 (July 14) 1943.

25. Low-Beer, B. V. A.: External Therapeutic Use of Radioactive Phosphorus: I. Erythema Studies, Radiology **47:** 213-222 (Sept.) 1946.

26. Heidelberger, C.; Brewer, P., and Dauben, W. G.: The Synthesis of 1,2,5,6-Dibenzanthracene Labeled in the 9 Position with C^{14}, to be published. Reid, J. C.: Synthesis of Tyrosine Labeled with C^{14}, Science **105:** 208 (Feb. 21) 1947.

27. Lawrence, J. H.: Therapeutic Use of Artificial Radioactivity, Correspondence, J. A. M. A. **129:** 91 (Sept. 1) 1945. Wirth, J. E.: Essential Safeguards in Production and Use of Atomic Energy, Occup. Med. **2:** 428-438 (Nov.) 1946.

ROENTGENOLOGIC CONTRIBUTION TO THE DIAGNOSIS OF FUNCTIONAL INTESTINAL DISORDERS

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The intestine is anatomically constructed and physiologically equipped to digest food and to eliminate waste. To accomplish these purposes it has three fundamental kinds of activity: secretion, absorption and motility. Intestinal function is the sum of these activities. For purposes of study and discussion it has been expedient to consider them separately as distinct intestinal energies. This analytic manner of thinking about and investigating intestinal function may have the advantage of clarity and directness in many of the problems connected with this function, but it is important to realize that these activities actually cannot be divorced in this way. They have an essential interdependence. In health they cooperate in a literal sense to effect what is called a "normal" or "healthy" intestinal function. In disease any maladjustment of or interference with one of the basic activities is associated with or may actually cause observable change in the performance of the other two.

The roentgen rays have given to medicine a method of observing the intestine of man and animal in action without having recourse to laparotomy. By introduction of substances into the intestinal tract which are opaque to the roentgen rays it is possible to observe how the intestine handles a bolus with the physical and chemical properties so acquired. With some reservations roentgenologists infer that the intestine handles food in a similar manner. The particular intestinal activity thus observed is its motility, that is, the mechanics of intestinal movement. Increase in intestinal secretory activity or decrease in intestinal absorptive activity or a combination of both are observable also, but only in a limited way and largely by inference again—chiefly by noting the presence of an excessive amount of intraluminal fluid and gas. Roentgenologic studies on the physiology of the intestine are usually concerned, however, with the phenomena of its movements. Since the basic intestinal activities are interrelated so intimately, deductions about the secretory and absorptive activities may often be made from observations on intestinal motility, and so the roentgenologic method has earned a prominent place among other methods of studying the physiology of the intestine in health and in disease.

The causes of intestinal dysfunction are as many and as different in origin and kind as are the factors which can adversely affect any one or all of the fundamental intestinal activities.

Constipation, diarrhea, colicky or cramplike abdominal pain, nausea, vomiting, abdominal noises and intestinal distention are symptoms which direct attention to the intestine. They have a mechanical connotation, and we tend to relate them to a derangement of transport of intestinal content. They are manifestations of intestinal malfunction, but not of its cause. Any etiologic type of intestinal dysfunction may be manifested clinically by symptoms of this kind, singly or in various combinations.

From the Section on Roentgenology, Mayo Clinic.
Read before the Section on Gastro-Enterology and Proctology at the Ninety-Fifth Annual Meeting of the American Medical Association, San Francisco, July 4, 1946.

INTESTINAL DYSFUNCTION ASSOCIATED WITH DISEASE IN THE INTESTINE ITSELF

Pathologic structural alteration in the intestine that has reached macroscopic proportions can be expected to produce functional change of some degree, although the functional change may not be great enough to be noticed by the patient or detected by the physician even with the use of his most direct and revealing diagnostic instruments. Such structural change may be the result of a neoplastic or inflammatory process arising in the intestine itself, or it may be the result of an extension of similar lesions to the intestine from neighboring or contiguous viscera. Included in this category are those congenital or acquired anomalies of intestinal structure which become pathogenic only under certain circumstances, such as diverticula, anomalies of size, fixation and position and other structural intestinal defects. Intestinal dysfunction that develops as a result of any of these changes is said to have an organic basis.

The first and most important objective of the physician confronted with a patient who exhibits the clinical manifestations of deranged intestinal function is to exclude the existence of organic intestinal disease or pathogenic structural abnormality as the cause of the disorder. To do this effectively he turns to diagnostic procedures which can deliver positive or negative evidence that is direct and objective. If abnormality is suspected to exist in the rectum or the sigmoid colon, the proctosigmoidoscopic examination is done first. This examination has obvious and insuperable advantages over even the most competently performed roentgenologic examination in the investigation of these portions of the large intestine. It takes advantage of direct vision and contact, and so the structure and the color of the mucous membrane and the presence and the nature of exudates and secretions are immediately perceived, and material for bacterial culture and biopsy can be taken at once. For the portions of the intestinal tract above the reach of the proctosigmoidoscope, the small intestine included, the roentgenologic examination has become the most important and revealing diagnostic maneuver which the modern physician has at his disposal. It is a method which can be made to reveal the existence of pathologic structural change at least as early in its pathogenesis as it is able to manifest itself by clinical signs and symptoms. The phrase "can be made to reveal" is used advisedly, because it must be presumed that the appropriate maneuver is chosen, that it is conducted competently and that the patient is strong enough to stand the rigors of the particular examination that his problem demands. Obviously this ideal is not always realized even by the most competent roentgenologic diagnosticians, but when they fail they are inclined to impugn the personal factor and not the method. If I seem thus to overestimate the efficiency of the roentgenologic method in the diagnosis of structural intestinal change,

it is chiefly because I wish to underline my conviction that the most important contribution roentgenologic diagnostic maneuvers make to the diagnosis of functional intestinal disorders is the efficient role which they play in the exclusion of organic intestinal disease as the cause of a given set of clinical manifestations of functional intestinal derangement.

It appears that advances in roentgenologic diagnosis in general, and in the field of gastroenterology in particular, have been closely linked with the development and definition of morphologic syndromes on which a pathologicoanatomic diagnosis can be constructed, to the exclusion, by and large, of roentgenologically observable physiologic changes caused by pathologic changes in structure. The original roentgenologic efforts in gastroenterologic diagnosis were concerned principally with the normal and abnormal physiology of the alimentary tract, from the oral cavity to the anus. The roentgenologic diagnostic syndrome of gastrointestinal disease that were developed then were essentially and almost exclusively physiologic. Today such roentgenologically observable changes in the intestinal tract as local or general hypermotility, hypomotility, hypertonus, hypotonus, spastic phenomena and changes in the secretory and absorptive activities that can be exhibited with the use of roentgen rays are made use of chiefly to stimulate an intensified search for a cause, and the cause is presumed to be organic, that is, structural, until proved otherwise. This is not to minimize their importance, but there are few, if any, roentgenologic syndromes of organic gastrointestinal disease in which the accompanying functional alterations have the necessary quality of definitiveness. This trend toward the morphologic is observed also in other fields of roentgenologic diagnosis. In urography, cholecystography, ventriculography, encephalography and myelography, lienography and hepatography, hysterography and salpingography, the purpose is always the same, the achievement of a basis for a pathologicoanatomic diagnosis, even when the roentgenologic test depends primarily on a preserved functional capacity of the organ under consideration, as is the case in cholecystography and intravenous urography. Roentgenologic diagnosticians are expected to elicit diagnostic data which will enable them to use the diagnostic language of the pathologists. This trend is not surprising, nor is it to be strenuously opposed, for the pathologist is usually the final arbiter in matters diagnostic, and his influence has elevated the plane of roentgenologic diagnostic efficiency immeasurably.

INTESTINAL DYSFUNCTION ASSOCIATED WITH EXTRAINTESTINAL DISEASE OR DYSFUNCTION

Disturbance in the physiologic activities of the intestine, sometimes of considerable magnitude, is also observed to exist in association with organic change in or functional derangement of adjacent or neighboring extraintestinal but intra-abdominal viscera, such as the stomach, the gallbladder, the pancreas, the liver and the genitourinary organs. Most of the time the clinical manifestations of intestinal dysfunction are obviously of little consequence, but there are times when they are prominent enough to obscure the clinical manifestations of the primary disease. The manner in which the intestinal disturbance is brought about —its mechanism—may be obvious in most instances, but in others it is understood poorly or not at all. The same may be said of intestinal dysfunction resulting from, or seen in association with, organic and functional alteration in the central nervous system, in the cardiovascular system and in diseases that are more or less systemic in their effects and manifestations like the chronic infectious diseases, nutritional deficiencies, endocrinologic and metabolic disorders, ocular and labyrinthine diseases and addictions to drugs. In all these etiologic types of intestinal dysfunction the relationship of cause and effect may not be clearly perceived, but it is apparent that some such relationship exists. I designate all these varieties of intestinal dysfunction fundamentally neurogenic in origin, for in one way or another, and on final analysis, the intestinal disturbances may be considered as resulting from imbalance of the autonomic innervation of the intestine or from a functional or organic disturbance in its intrinsic innervation. Whatever the mechanism of their production, clinical manifestations of intestinal dysfunction of all types and of all grades of severity are encountered.

Roentgenologic examination of the intestine may or may not reveal confirmatory evidence of the dysfunction which the clinical manifestations indicate to be in operation. This seems to depend largely on the severity of the manifestations. As is the case when intestinal dysfunction occurs as a result of organic intestinal disease, there are observable changes in intestinal motility, in tonus and, to the extent that they are observable roentgenologically, in the secretory and absorptive faculties of the intestine. A description of the particular kind of intestinal functional change that occurs as a part of the diseases of the organs and systems which I have listed will not be included in this discussion. Roentgenologically demonstrable functional changes that are in any way characteristic are observed in one category only, that of the nutritional deficiencies, in which I include the poorly defined but similar syndrome developed as a result of digestive secretory deficiency. There, however, the physiologic alteration is of considerable magnitude, having been in operation long enough to cause, or to be caused by, certain possibly reversible structural changes in the intestine and probably in its intrinsic nervous system as well. In the other categories the functional changes are nonspecific, at least in the sense that their cause might be predicted or even guessed at objectively with only the roentgenologic changes noted in the intestinal tract at hand.

It is possible that we roentgenologists have been failing to realize the scientific possibilities of a more intensive roentgenologic study of these functional intestinal disturbances. The observations of Brown, Pendergrass and Burdick [1] on the changes in motility in the gastrointestinal tract in hyperthyroidism are illuminating, but I have not become acquainted with comparable observations in the other categories. At the moment, I do not foresee just how studies of this

1. Brown, R. B., Pendergrass, E. P., and Burdick, E. D.: Gastrointestinal Tract in Hyperthyroidism, Surg., Gynec. & Obst. 73: 766-783 (Dec.) 1941.

kind assist practical clinical diagnosis to an appreciable extent, but they may well serve to throw light on more fundamental problems of pathologic intestinal physiology.

Quite obviously roentgenologic examinations of the particular organs and systems are used liberally in the process of localizing the disease or functional derangement which is in turn causing these secondary kinds of alteration in intestinal function. Once structural and functional change in intra-abdominal and extra-abdominal organs and systems capable of exerting an unfavorable influence on the intestine is excluded, then, simply by a process of elimination, the clinical manifestations of intestinal dysfunction are pronounced to be on a primary functional basis.

INTESTINAL DYSFUNCTION WITHOUT DEMONSTRABLE CAUSE OR ASSOCIATION

It is apparent that to entertain a diagnosis of functional intestinal disorder, in the commonly accepted restricted sense of the term, requires a much greater diagnostic effort than is usually needed for any other gastroenterologic diagnosis. Nevertheless this kind of a diagnosis must be made more frequently than any other. Bockus and Willard,[2] for instance, found some type of functional abnormality of the large intestine in 46 per cent of 1,000 consecutive office patients whose clinical records were studied, and Jordan and Kiefer [3] found a similar situation in 30 per cent of a large number of hospitalized patients.

Intestinal dysfunction without demonstrable anatomic or physiologic cause may be said to occur in the large intestine, in the small intestine, in restricted parts of either or in both divisions at the same time. In general the symptoms and the clinical manifestations point to a disorder in one or all of the fundamental digestive faculties of the intestines, just as they do in physiologic disturbances for which an organic cause can be found. The clinical manifestations vary in intensity from those that are considered to be mild or relatively inconsequential to those that are pronounced and severe enough to cause genuine alarm in patient and physician. They have been variously correlated and classified under the general heading of intestinal neuroses. One clinical type is recognized in which the symptoms and signs indicate that the intestinal motility is chiefly disturbed; in another type, symptoms of secretory dysfunction predominate; in a third type, evidence of disturbance of both functions is observed. Simple constipation and so-called functional diarrhea are either included in one of these types or are treated as separate functional entities. Roentgenologic classifications are not often seen, but when they are made they tend to follow a similar pattern. The disorders are usually ascribed to the large intestine as if the small intestine had no part in them, but many writers emphasize that the derangements are general in the entire gastrointestinal tract although the manifestations may be most prominent in or confined to the large intestine.

Again the manner in which the functional derangement is produced is unknown, but the underlying factor is presumed to be a subtle psychogenic or emotional disturbance related to the intestine through the medium of the autonomic nervous control of the several intestinal activities. As is so frequently the case in biologic science in general, there is considerable knowledge about what occurs, but relatively little is known about why or how it occurs.

I do not intend to describe or even to list the roentgenologic evidences of primary intestinal dysfunction that have been described. Presumably most of them are valid when properly controlled. To recognize the presence and to evaluate the significance of these changes require an intimate knowledge of the normal intestine and its variations in the morphologic as well as in the physiologic aspects. In no field of roentgenologic diagnosis is the exercise of critical judgment and objectivity more necessary if unwarranted deductions and correlations are to be avoided. The roentgenologic investigation which is instituted to explain clinical manifestations of intestinal dysfunction, to localize the abnormality to some particular part of the intestine, to designate its nature or otherwise define it is to be looked on as an experiment in clinical research subject to control of extraneous influences, unrelated to the immediate problem, but independently capable of effecting changes in intestinal activity. The roentgenologic investigation which is instituted to discover and to define structural change in the intestinal tract is different in this respect, that in it physiologic alterations are largely relegated to a position of secondary importance, sometimes disregarded entirely, often circumvented, all in an effort to obtain the essential morphologic data on which to construct a pathologico-anatomic diagnosis. It is often necessary to induce rather drastic changes in what is called the "normal physiologic condition of the intestine" preliminary to the roentgenologic examination; some of these changes are prolonged and not easily distinguished from preexisting physiologic abnormalities. I cite as instances the rigorous purgation necessary to prepare the colon for examination with the opaque enema, the prolonged fasts preliminary to examinations of the stomach and small intestine and the administration of antispasmodic drugs. These must receive their share of attention when the diagnosis of a functional intestinal disorder is being considered.

There are other more or less distinctly unphysiologic aspects of the roentgenologic investigation of functional disorders of the intestine which require deliberation, too. Some of them are related to the patient, and some to the method itself.

The patient submits himself to the examination under varying degrees and kinds of emotional stresses. The individual variation is great, practically beyond limits of description. No 2 patients react to the examination or to particular features of it in the same way. Fear, apprehension, modesty, impatience and many other adverse psychologic reactions immediately connected with the conditions of the investigation, and related indirectly or not at all to the reasons for it, may be the cause of minor, but also of major deviations from the somewhat arbitrary standards of normal intestinal activity.

Some of the unphysiologic features inherent in the roentgenologic method have already been mentioned.

2. Bockus, H. L., and Willard, J. H.: Functional Disorders of the Colon, Pennsylvania M. J. **37**: 645-652 (May) 1934.

3. Jordan, S. M., and Kiefer, E. D.: The Irritable Colon, J. A. M. A. **93**: 592-595 (Aug. 24) 1929.

There are others. The opaque enema, for instance, is an unnatural, unphysiologic and to most patients an abhorrent procedure, even if administered without preliminary purgation and enemas. In my opinion the evidence of abnormal physiologic change brought to light with its use is highly unreliable, especially if the evidence is based on changes observed only once and perhaps only at the time of a single roentgenographic exposure. I hesitate to attach abnormal physiologic significance, for example, to a contracted portion of the sigmoid colon in which the pattern of the mucous membrane is essentially unchanged, to a general decrease or increase in the caliber and length of the intestine, again with the pattern of the mucous membrane unchanged, or to so-called functional changes in the pattern of the mucous membrane when evidence of other change is lacking. In view of the unphysiologic character of this particular examination it is easier to think of such changes as being inherent in the procedure than to ascribe clinical significance to them without due consideration of all possible factors in their production.

There are certain features about the opaque meal, too, which give cause for reflection when search is being made for roentgenologic evidence of intestinal dysfunction. The opaque suspension may be unpalatable or nauseating to the patient, a circumstance which may alter the motility of the small intestine, if only by causing delay in the emptying time of the stomach. The time required for standard opaque meals to pass from the stomach through the small intestine and thence through the colon is by no means constant. This transit time may be accelerated or decelerated by one or a combination of several of many extraenteral factors. For purposes of investigating the motility of the intestine, and by this I mean the character and effectiveness of its movements, the opaque meal must be standardized not only in its composition, but also in its temperature, quantity and viscosity and in the manner of administration—that is, in small quantities over a relatively long period of time or in total amount at one time. Medication that the patient has been receiving must be given consideration as to whether it has affected the intestine primarily or not. In the large intestine and even low in the ileum the contrast meal tends in most persons to become dehydrated and thereby loses some of the physical characteristics it had when it was administered. I cannot lose sight of this which seems to me to be an important factor of apparently abnormal intestinal activity, especially in the patient who is habitually constipated or is constipated for the time being for one of several reasons, such as recent purgation, change of diet, apprehension or other emotional upset. I visualize the physical state of that viscous heavy mass with which the colon is struggling and suspect that perhaps the colon which under these circumstances has a normal appearance is the one which should be held in suspect.

These are but some of the sources of confusion in the roentgenologic diagnosis of primary functional intestinal disorders. Another is related to the diagnostic nomenclature. For what it is worth, my experience leads me to suspect that the nomenclature was derived from clinical and not from roentgenologic sources. I say this because I so rarely find convincing roentgenologic evidence of intestinal irritability, of spastic phenomena, of intestinal instability or of hypersecretion of mucus in patients whose clinical symptoms warrant, in the opinions of my gastroenterologic consultants, such diagnoses as "irritable colon," "spastic colon," "unstable colon" and the current equivalent of the term "mucous colitis." I am impressed also with the frequency with which I see patients who have large dilated rectal ampullae, and other patients who have conspicuously long and comparatively voluminous colonic loops, who are not and never have been constipated. As I read the literature on functional intestinal disorders, I note that a narrow contracted descending colon can be the cause of constipation in one patient and the cause of diarrhea in another. The best examples of the mucous "string sign" of Crane which I have collected were in patients who happened to have no prominent clinical evidence of intestinal dysfunction, but were subjected to roentgenologic examination for entirely different reasons.

It is not without considerable chagrin that I set forth some of the difficulties which I personally encounter with the roentgenologic diagnosis of functional intestinal disorders. Some of them are, I think, real and are sensed by many roentgenologic diagnosticians; others are possibly peculiar to me and to the nature of my practice. In no sense is it my intention to discourage continued endeavor along these lines, but I would like to encourage the adoption of a critical attitude to avoid unwarranted conclusions and correlations which are made now and then.

COMMENT

Without doubt the greatest contribution which the roentgenologic examination of the intestine makes to the diagnosis of functional intestinal disorders is the facility and accuracy with which it can be made to exclude organic intestinal disease as the cause of the clinical manifestations of dysfunction. Roentgenologic diagnostic maneuvers are also called on to assist in the diagnosis of disease in extraenteral organs which cause intestinal dysfunction indirectly. To the diagnosis of what I have chosen to designate as primary functional intestinal disorders, that is, those that have no demonstrable somatic cause, the roentgenologic examination of the intestinal tract has, in my opinion, no definitive contribution to make. Possibly improvement in this field will come as knowledge of the fundamental neuromuscular mechanism of intestinal activity accumulates. In the meantime I venture to propose that the roentgenologic examination that is undertaken specifically for the study of intestinal function be better adapted to that purpose, chiefly by eliminating so far as it is possible to do so all extraneous factors that may influence intestinal function adversely. Some of these have been indicated; others will suggest themselves. Much knowledge will of course continue to be derived from careful correlation of clinical and roentgenologic data. The possibilities of newer roentgenologic technics, such as kymography, have only begun to be explored. The most salient information will probably originate, as it has in the past, from the physiologic clinical research laboratories.

TREATMENT OF INTESTINAL CONDITIONS AS BASED ON DISORDERED FUNCTION

DONOVAN C. BROWNE, M.D.
GORDON McHARDY, M.D.
and
GEORGE WELCH, M.D.
New Orleans

The therapeutic requisite for the functionally deranged intestinal tract is adequate knowledge of established normal enteric behavior coupled with cognizance of the many factors causing alteration in this functional pattern.

The psychogenic functional intestinal disorders in motor, secretory, excretory or sensory physiologic disturbance may simulate or eventuate in clinical syndromes emanating from primary structural change. Conversely, organic intestinal impairment, systemic disease or infection, chemical reactions, deficiency states, endocrinopathies and metabolic disturbances often, in the bizarreness of their symptoms, adapt themselves to or actually arise from psychogenic disease. The difficulty in clinical distinction is readily discernible; the issue is reemphasized to insist that a meticulous case study is an essential of therapeusis. One cannot condone the suggestion of Pulsifer [1] that from the history and from physical examination alone it is permissible to conclude that a disease is psychogenic. It is preferable to gain a conclusive diagnostic evaluation; thereby, speaking with certainty, one can instill assurance into the patient who by nature is a skeptic.

The management of functionally manifest enteritides, specific in causation, immediately appears simplified in consideration of therapeutic attack on the causal factor. However, too frequently the concomitant or resultant physiologic alteration in the intestines dominates the clinical picture, so that the result of treatment directed at the specific cause is obscured by the more persistent secondary disturbances.

The actual therapy of the psychogenic derangements is necessarily involved. No standardized program of treatment could be applicable to all patients with neurogenic disease. The specificity of pharmacologic aids is limited. Comprehensive interpretation of type of personality, structure and reaction evolves itself into evaluation of the intricate relationship of psyche and soma in the person susceptible to emotional precipitants. The true importance of emotional contribution to gastrointestinal disease is well appreciated; the classical work of S. Weir Mitchell, Pavlov and Beaumont and the more recent contributions of Alvarez,[2] Wolf,[3] Jones [4] and others [5] leave little for the authors on the psychodynamic aspects of battle reaction to add. It is disappointing that too few of the observers during this recent global strife felt that the indications for therapeusis fell within the realms of internal medicine; there was too great a tendency to label many easily rehabilitable patients neuropsychiatric and to discharge them so stigmatized. Now that large group of emotionally disabled patients with gastrointestinal disturbances who either should not or would not be permitted to be relegated to the psychiatrist for therapeusis returns to civilian life to join the "big time operators" (Dr. Sarah Jordan) at a time of great national instability. Evaluation to determine whether the entity is truly psychogenic in origin, existing with or without resultant organic disease, and whether the causal emotional factors are too deep seated and too complicated to permit management without the assistance of a neuropsychiatrist therefore is the first move. It is immediately obvious that the constitutional psychoses are neuropsychiatric problems, that certain of the persons with depressive psychosis, hysteria, compulsive obsessions or hypochondria and the persons who are simply inadequate will require cooperative management with the neuropsychiatrist, and that the larger group would not appreciate being termed neuropsychiatric, but would resent it to the degree that resultant insult to the psyche would actually be detrimental to the patient's future. Eusterman [6] has suggested that a neuropsychiatrist should be consulted only if after eight weeks of management the patient has failed to respond. Sarah Jordan [5c] indicates that in most cases of acute disease there will be spontaneous response to reassurance, but warns that the cases of long standing require, besides reassurance and readjustment, the supplement of actual therapy of the gastroenteric tract in restoration of neuromuscular and secretory function and that if these measures precede the development of organic disease the prognosis is favorable.

MANAGEMENT OF THE PATIENT

Psychotherapeusis is difficult to break down to a simplified therapeutic process. An attempt is made to bring forth the practical aspects applicable to the patient who can and will be best managed by a competent physician who has an understanding of personalities. This paper cannot be an intensive review of psychotherapy. In agreement with Chester Jones [7] we feel that a competent "family physician" who has the confidence of the patient is in the best position to provide reassurance and stability if he is willing to dedicate the time in applying basic educational principles to create for the psychogenically disturbed person what will be for that person an artificial regulation of living habits, regularity of rest and exercise approaching as closely as attainable a normal life for his individual abilities.

Yoskin [8] simply depicts the therapeutic picture to encompass the fields of rapport, ventilation, desensitization, restraint, reeducation and stabilization, psychotherapy of the family and compromise formation.

Most patients are best managed with an initial period of hospitalization whereby an environmental change is realized; they are relieved of annoying responsibilities and permitted a supervised regimen including physical and occupational therapy. This period is equally important to the physician, permitting him an opportunity to study his patient in a stable environment with the assistance of trained observers.

From the Department of Medicine, Tulane University School of Medicine, and the Gastrointestinal Clinic of Touro Infirmary, New Orleans.

Read before the Section on Gastro-Enterology and Proctology at the Ninety-Fifth Annual Session of the American Medical Association, San Francisco, July 4, 1946.

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2. Alvarez, W. C.: The Mechanics of the Digestive Tract, New York, Paul B. Hoeber, 1928.
3. Wolf, S. G., and Wolff, H. G.: Human Gastric Function, New York, Oxford University Press, 1943.
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5. (*a*) Ivy, A. C.: Ohio State M. J. **40**: 925-929, 1944. (*b*) Portis, S. A.: Medical Treatment of Psychosomatic Disturbances, with Special Reference to Gastrointestinal Tract and Fatigue, J. A. M. A. **126**: 413-418 (Oct. 14) 1944. (*c*) Jordan, S. M.: Gastroenterology **3**: 73-78, 1944. (*d*) Palmer, W. L.: M. Clin. North America **28**: 418-428, 1944.
6. Eusterman, G. B., in discussion on Vorhaus, M. G., and Orgel, S. Z.: Psychosomatic Relationships to Gastrointestinal Diseases, J. A. M. A. **126**: 225-231 (Sept. 23) 1944.
7. White, B. J.; Cobb, S., and Jones, C. M.: Mucous Colitis: A Psychological Study of Sixty Cases, Psychosomatic Medicine Monograph I, Menasha, Wis., George Banta Publishing Company, 1939.
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The practical application of principles by the average physician requires the desire and ability on his part to attempt physical and mental reeducation of the patient to create that mode of life termed "normal," though "artificial" to most patients.

The physical factors are concerned with modification of the method and mode of expenditure of physical effort to the abilities of the person. This evolves itself into regularity of living, individual application of physical exercise in competitive or noncompetitive activities as is elected best, adequate and well organized rest and recreational routine, regular eating habits and normal bowel hygiene.

Mental alteration assumes ability of the physician to alter the patient's reactions and with the patient to adjust certain flexible environmental influences. This includes correction of rigid attitudes of resentment, anxiety and sympathy. Creation of "insight" follows along the same line with evaluation of the patient's problems in terms of symptoms arising from emotional precipitants. Patient guidance in solution of conflicts is substituted for flight from reality. When possible, adjustment of social, economic, occupational, domestic, marital, sexual and other conflicts is achieved by alteration of environment to patient or vice versa. Disciplinary measures are especially applicable in the high strung hysteroid persons to aid them in understanding that they may not be permitted to aggravate their fears or use them for exploitation. Reassurance by the confident physician is of value, permitting a degree of transference of responsibility for judgment and well placed praise for accomplishment. Suggestion therapy in the form of hypnosis, placebos, "vaccines" and "medications" has limited value; hypnosis alleviates many hysterical manifestations temporarily, and the inadequate person may be favorably influenced by the judicious application of the other forms of "ritual" suggestion. The mental reeducation of the patient will involve the application of all these measures to some degree; elected instances will require adjunct psychiatric consultation for psychoanalysis, "shock" therapy and more intensive psychotherapy. Careful management and intense interest on the part of the gastroenterologist will tend to achieve "resolution" of the neurosis, which amounts to adjustment of patient and environment to an extent where he is able to live in a degree of compatible harmony with the "rest of the world."

Chester Jones [7] suggested that a psychiatrist who has combined his knowledge of psychiatry with an understanding of the mechanisms of the enteric tract has much to offer gastroenterology; he added that such men are few in number. He concluded his analysis of the situation with the statement, "No one psychotherapeutic approach is universally applicable and the prescription must generally be based on a complex mixture." This unquestionably is true; a diagnostic issue, a psychiatric problem and a gastroenterologic management demand one competent to handle all three issues, and, further, besides the management of the patient there are dietary and medical considerations.

DIETOTHERAPY

It is agreed that unnecessary dietary restriction is detrimental and possibly may increase the patient's preoccupation with somatic complaints. Often, however, we are concerned with removing fads and fancies from the patient's concept of dietary management derived from injudicious medical advice or from self judgment of food idiosyncrasy. The simplest plan is to emphasize the importance of regular eating habits, stressing their relation to regulating gastroenteric motility and secretion, to indicate the requisite amounts of the essential ingredients and to incorporate these essentials in a typed-out, normal, nonirritating diet, preferably dictated in the patient's presence to indicate its applicability to his instance. Since the extremely irritable gastrointestinal tract is stimulated by any and all foods, some patients may be benefited by a twenty-four hour starvation period. In all cases having the additional instruction to grind all meats and purée all fruits and vegetables and to limit the quantities in the initial weeks of treatment is worth considering, with removal of these restrictions when the patient's condition is responding satisfactorily. Since to our way of thinking such is actually a normal dietary program, with condiments and special dishes the design of restauranteurs to persuade one to be indiscreet in diet, we consider it wise to point out to the patient that he is merely being instructed to behave normally and that he, being a gastrointestinally sensitive person, must not depart into dietary extremes at any time for fear of recurrent manifestations.

If one considers reflex (enteric) esophagospasm, reflex biliary dyskinesis and certain instances of hypoglycemia and ulcerative colitis as psychogenic in association or origin, then for these exceptions a more elaborate dietary program must be individualized to each instance.

Portis' [9] "fatigue" syndrome related to hypoglycemia may be managed as he vaguely suggests, by a "high protein, moderately high fat and relatively high carbohydrate diet," with the omission of free sugar and the addition of feedings at night. (Considering the possibility that this may be related to hypermotility of the bowel, we include it in this consideration.)

Respect for a patient's observations may lead one cautiously to outline an elimination diet when history of allergy is elicited. The principles outlined by Rowe or careful evaluation of the patient's assumed allergies may be adhered to until the physician has satisfied himself and the patient that no definite allergic phenomena exist.

In those instances of nutritional and vitamin deficiency, endocrinopathy and metabolic disease, specific dietotherapy is established.

PHARMACOLOGIC AIDS

The judicious administration of drugs is essential, though rarely specific. In most instances they are used for symptomatic relief in the period of adjustment. It is erroneous to use any drug which is habit forming or induces tolerance, and we therefore advise against all narcotics and amphetamine-like products.

The use of sedatives should be limited to the relief of pain and nervous tension. Analgesics in combination with sedatives and antispasmodics may often, by synergistic action, be more efficient. Narcotics should be limited to specific severe seizures. The barbiturates and bromides are most commonly used and either alone or in combination should be efficient; occasionally idiosyncrasy requires one to resort to chloral hydrate or the carbamide preparations. The minimum dosage

9. Portis, S. A.: Psychosom. Med. 6: 71-73, 1944.

should always be used and assurance against dependency emphasized, so that as the patient improves he comes to need such aid only in contingencies.

A multitude of antispasmodics are available; atropine and its derivatives persist in most common usage. When an idiosyncrasy to atropine exists one may

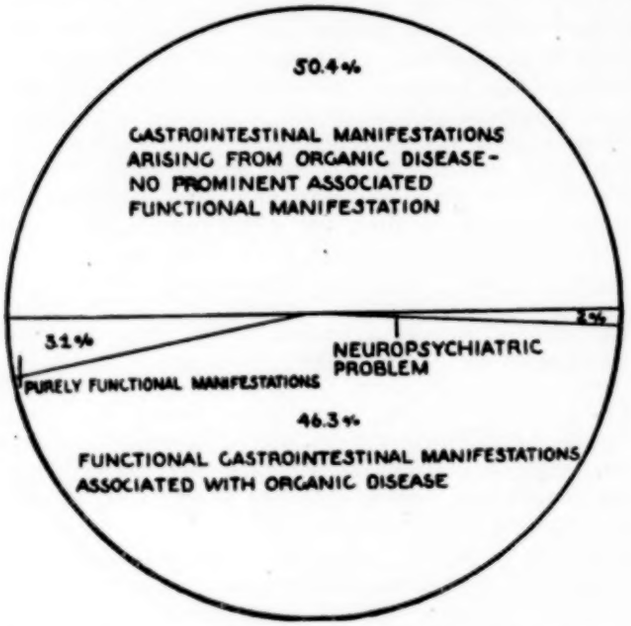

Chart 1.—Analysis of 500 consecutive cases of gastrointestinal disease.

elect to use one of several synthetic proprietary products. No antispasmodic approaches the efficiency of glyceryl trinitrate in the relief of esophagospasm and biliary dyskinesis. Theophylline ethylenediamine also is effective in the relief of esophagospasm.

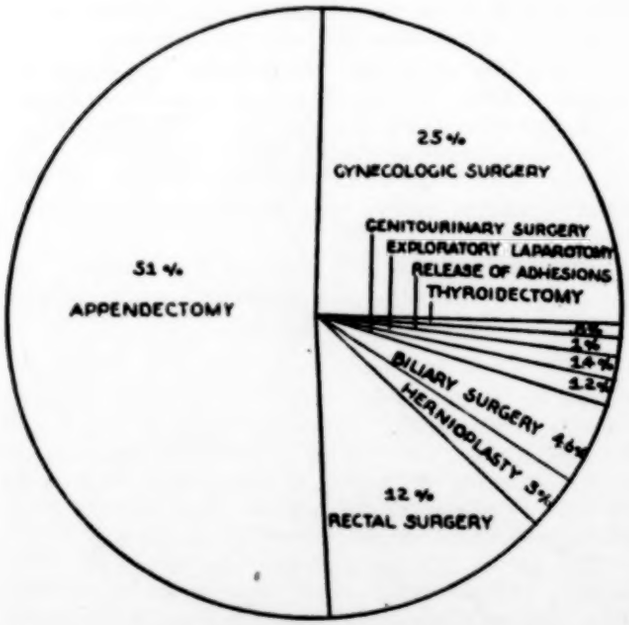

Chart 2.—Previous surgical treatment of functional manifestations.

Perhaps administration of calcium salts and parathyroid is an adjunct when there is sufficient suspicion of irritability of the smooth muscles of tetanic variety, and in certain of the deficiency states as sprue and celiac disease.

When patients have functional achlorhydria the administration of dilute hydrochloric acid is indicated as long as the status persists. So also in hyperacidity neutralizers such as alkaline powders and aluminum hydroxide have clinical application.

Substances aiding regulation of the bowels are essential in the irritable colon resulting in either constipation or diarrhea. The constipated person may occasionally be permitted mild cathartics initially in combination with liquid petrolatum, agar preparations and the other bulk-producing hydroscopic substances. As efficient management progresses all laxatives are withdrawn and use of rectal instillation of warm vegetable oils satisfies the patient's need for an occasional emergency evacuation.

We cannot establish an indication for therapeutic enemas and irrigations of the colon in the management of psychogenic colonic dysfunction. We are inclined to doubt clinically the value of sodium ricinoleate for detoxification.

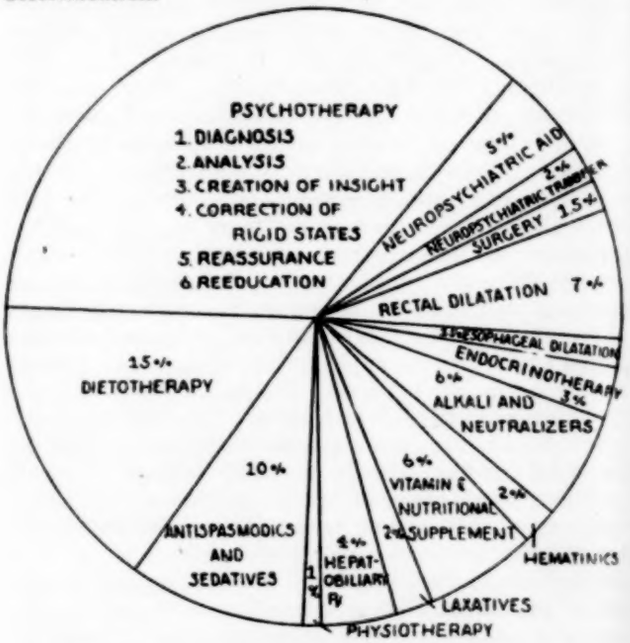

Chart 3.—Relative amounts of different types of treatment.

In the acute episodes of diarrheal states opiates may be required in general, absorptive astringents such as kaolin and pectin are excellent aids to supplement dietary instruction and sedation.

It is difficult to be tolerant with the advocates of bacterial vaccines for uncomplicated mucous colitis.

When dietary restriction, hypermotility or abnormal secretory response has resulted in anemia due to deficiency of iron, subclinical or clinical hypovitaminosis, these must be corrected specifically. We are inclined to favor various simple "tonic prescriptions" and the careful use of insulin to stimulate the appetite of the malnourished patient.

We are not attempting an intricate therapeutic outline for each of the symptoms arising from the physiologic disturbance, for the patient must be considered on the whole with a broad attitude of management covering the disturbance in its entirety.

ADJUNCTIVE MEASURES

Operative measures include operation on the sympathetic nerves for megacolon, correction of associated diseases requiring operative measures, rectal dilation

for uncomplicated anal spasm and esophageal dilation, when necessary, for reflex cardiospasm. In general one should adopt an attitude of extreme conservatism in advocating any surgical measure. On the whole operation on the sympathetic nerves for relief of pain is not acceptable.

Physical therapy, including simple massage, exercises (passive and active), hot packs and diathermy have both a general and a specific application. Often simple measures such as contrast showers and warm tub baths do much to relax the tense patient.

Occupational therapy coupled with an effort at social and economic adjustment may call for more than passing consideration in aiding the patient to outline a useful constructive program of living.

To illustrate the relation of the issue to gastroenterologic practice, we surveyed 500 consecutive ambulatory patients with gastroenterologic disorders in an attempt to gain an evaluation of the problem (chart 1).

These results were surprising to us. In recent years so great a prominence has been given to disease of neurogenic causation that we had anticipated its predominance. Perhaps review of a larger series of cases would alter the relation to some extent, but we are forced to the conclusion that meticulous study of cases will eliminate many of the purely functional instances.

This left us 247 patients in whom functional disturbances existed. The average duration of symptoms prior to examination was 7.8 years. All had had previous medical care; a group (51.2 per cent) subjected to various surgical measures without relief is charted (chart 2). This evidence of mismanagement is recognized and is mentioned only to reemphasize the importance of diagnosis.

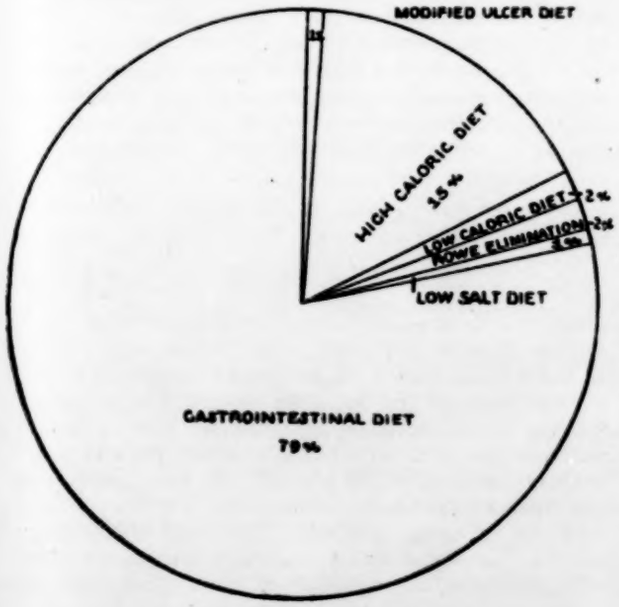

Chart 4.—Dietotherapy.

The breakdown of our management of these cases exclusive of correction of the causal organic factor is approximated as closely as possible in relation to importance of application (chart 3). Hospitalization was considered necessary in 10.2 per cent of cases.

Dietary instruction was meticulously exacted. In general the principles mentioned earlier in the paper were applied. Our specific application in these cases is illustrated (chart 4).

An approximation of what we might hope to achieve by this management is outlined in chart 5.

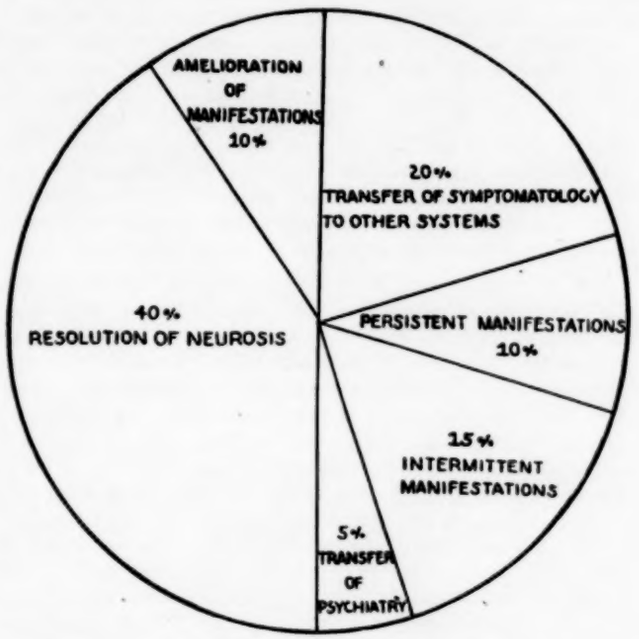
AMELIORATION OF MANIFESTATIONS 10%
20% TRANSFER OF SYMPTOMATOLOGY TO OTHER SYSTEMS
40% RESOLUTION OF NEUROSIS
PERSISTENT MANIFESTATIONS 10%
15% INTERMITTENT MANIFESTATIONS
5% TRANSFER OF PSYCHIATRY

Chart 5.—Effectiveness of therapy.

CONCLUSION

There is no summarization for this presentation; it deserves expansion. It is hoped that we have stimulated an interest in the treatment of these functional intestinal disorders and the inclination properly to evaluate the problem first and then to treat the patient sincerely and rationally, discarding the indifference commonly felt toward those easily labeled neuropsychiatric.

1534 Aline Street.

ABSTRACT OF DISCUSSION

ON PAPERS OF DR. WEBER AND DRS. BROWNE, MC HARDY AND WELCH

DR. SARA M. JORDAN, Boston: In this era when the word "psychosomatic" is used so glibly, this symposium on intestinal dysfunction seems appropriate. We are accustomed to think of functional indigestion as of two categories: (1) that which is psychosomatic, altogether or in part, and (2) that which is somatic in origin. It is my opinion that the cases which are of short duration are often on a psychogenic basis, and in those instances psychotherapy is completely effective. In this group, however, certain cases of longer duration originally were on a psychogenic basis, but indigestion and dysfunction have become habitual. In these cases I believe that treatment for the somatic condition is definitely a necessity. In the second group of cases, I believe, functional indigestion is purely on a somatic basis, and I should like to use a new word in this connection, the word "somatopsychic," because one should not forget that there are not only psychosomatic but somatopsychic persons. There are some somatopsychic persons in this group of patients whose symptoms are produced by various causes, such as excessive food roughage, colonic interference in the form of laxatives and colonic irrigations, infections which leave a residue, physical stress and strain, and sometimes allergy, and in that group of

patients there is a definite somatic factor, with occasionally an effect on the nervous system and the psyche, the reverse of the psychosomatic. Here treatment with digestive management is exceedingly important. These patients will not be cured by psychotherapy; they must be treated with digestive management. A few words about the roentgenologic diagnosis of functional indigestion: I disagree with Doctor Weber, inasmuch as I believe that if the patient is not prepared with purgation as roentgenologists are accustomed to do, there is an excellent opportunity to find out by roentgenologic examination much about digestive dysfunction, both with the meal and particularly with the barium enema. A gastrointestinal study is carried out, of course, to exclude organic disease, as he said; but it is also done in order to find out how that digestive tract—particularly the small and large intestines—functions, and repeated observations usually confirm the single observation. Furthermore, follow-up results after treatment show the changes from intestinal dysfunction to good intestinal function.

Dr. Zachary Sagal, New York: I wish to call attention to the importance of taking a detailed initial history in these cases of psychosomatic disease, for the purpose of subsequently evaluating the results of management, not so much from the standpoint of the physician as from the standpoint of the patient. We are dealing here with highly suggestible and self-indulgent persons to whom every minor discomfort looms large, and who will be dissatisfied with the treatment, although a good deal may have been accomplished. It has been my experience often that, after a period of management of eight months or a year, the patient will say "Here, Doctor, I have been coming to you so long and I don't see any improvement in my condition." If one is able to go back to the initial history and check up and confront the patient with statements such as, "When I first saw you, you complained of this, and that and the other thing," each time one will get the reply, "Yes, that hasn't bothered me much," and, "Well, that has improved." One will find that the patient is satisfied to realize that the major complaints, or at least 75 per cent of the initial complaints, have been alleviated. Otherwise the few complaints which the patient still has seem to loom large in his or her imagination, so that the patient has the notion that he has not been at all benefited. From the standpoint of therapy it is important, because the patient will be relieved of the anxiety that there has not been any improvement in his condition.

Dr. A. F. R. Andresen, Brooklyn: It has been a treat to me to listen to this conservative discussion today of psychosomatic influences on the gastrointestinal tract. I do not know where the radical psychosomatists are today. The fine presentation by Dr. Bargen[1] would keep us on even keel in regard to this subject of the influences of the psyche on the gastrointestinal tract. I like the term "somatopsychic" which Dr. Jordan gave us. I consider that important. On the other hand, I agree with Dr. Weber that one must not depend too much on what one sees in the roentgenogram as an indication of functional disturbances because, as he pointed out, many of the functional changes that are seen are really physiologic, or may be due to a variety of causes which some physicians have overlooked. He spoke of the distaste for the mixture as one of the points, and I might say that my colleagues and I made experiments with different flavors to try to decrease the distaste for the barium meal, starting with milk. We started with a delicious chocolate mixture, and many people were allergic to chocolate. We tried Coca-Cola as a flavoring, and that set up various disturbances in persons allergic to various constitutents of the Cola mixture. So one must be careful. One must not consciously look for evidences of psychic causes for these disturbances in the gastrointestinal tract; one should first rule out organic conditions. I recently had a man who was put through all sorts of psychologic tests and was given shock treatments over a period of several months, but who never had been given a thorough study. He was found to have a large retroperitoneal carcinoma which was involving his entire abdomen and chest, and everything else, by the time that he reached us; and he had been through a thorough course of shock therapy!

Dr. Harry M. Weber, Rochester, Minn.: Could Dr. Jordan and I have reviewed the cases which she presented together we would, I feel certain, be in complete unanimity of opinion. It was my purpose to argue for two distinct examinations of the intestine, one for the purpose of disclosing significant change in the physiologic activity of the intestine, the other for the purpose of determining the presence or absence of organic intestinal disease and of those congenital and acquired intestinal abnormalities capable of affecting the physiologic activity of the intestine adversely. To accomplish the latter satisfactorily it is necessary first to induce an unnatural or abnormal intestinal state, and then proceed to treat the intestine in a manner that in several ways is distinctly unphysiologic. A fundamental prerequisite, for example, is an empty intestinal lumen and an internal intestinal surface as free of "normal" intestinal content as it is possible to make it. To achieve this condition a prolonged fast is used in the preparation of the small intestine for roentgenologic examination, vigorous purgation in the preparation of the large intestine. These maneuvers are unphysiologic, and individual responses to them are extremely variable. Other factors are frequently introduced which alter the physiologic activity of the intestine, but that very alteration serves to make pathologicoanatomic change more clearly demonstrable. The roentgenologic examination conducted for the purpose of estimating the functional activity of the intestine should, I think, be conducted in a different manner. Factors capable of producing change in intestinal activity should be recognized and avoided or attenuated. Organic intestinal disease should have been excluded in a preliminary examination. The physiologic state of the intestine should certainly not have been altered by purgation, by a prolonged fast or by sedative medication. The patient should have been coached to present himself in the state which for him is routine and ordinary. As long as the insoluble salts of heavy metals continue to be used as contrast substances it will be necessary to make allowances for the specific effects which these substances have on intestinal motility. I would like to suggest that those who are conducting roentgenologic examinations of the intestine acquire and preserve an objective approach to this part of their work. It may have disadvantages, but these are outweighed by the critical attitude which this approach promotes. I would encourage such an attitude until there is more general agreement about the roentgenologic criteria used in the estimation of abnormal intestinal function.

Dr. Donovan C. Browne, New Orleans: I have nothing further other than to thank Dr. Jordan and Dr. Andresen for their talks.

1. Bargen, A.: Modern Concepts of Intestinal Function, J. A. M. A. **132**: 313 (Oct. 12) 1946.

Blood Pressure.—The first to measure blood pressure was Stephen Hales in England, who in 1733 attached a glass tube 12 feet 9 inches long to the left carotid artery of a horse, held the tube vertically and found the blood to rise to a height of 9 feet 6 inches. Poiseuille introduced the U form of mercury manometer in 1828. Von Basch, who was the first to perfect a sphygmomanometer for clinical use, had a glass cylinder containing a rubber bulb connected with a mercury manometer, later with a spring manometer. The open end of the glass cylinder was covered with a membrane. The cylinder was filled with water and was called a pelotte. The membrane of the pelotte was pressed over an artery against a bone. Potain's sphygmomanometer, 1889, replaced the water by air. Riva-Rocci in 1896 introduced the manometer of which most of the modern types are modifications. There has always been a question as to the effect on the blood pressure reading of the amount of soft tissue of the arm and the width of the cuff.—Downing, M. Elizabeth: Blood Pressure of Normal Girls from 3 to 16 Years of Age, *Am. J. Dis. Child.*, March 1947.

BENIGN STRICTURES OF THE BILIARY DUCTS

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The management of benign strictures of the biliary ducts is one of the most difficult problems in abdominal surgery. While the diagnosis is usually evident from the history, the operative intervention to restore the normal flow of bile into the gastrointestinal tract presents many technical problems and requires the greatest ingenuity on the part of the surgeon. This paper will report on a series of 123 patients operated on at the Lahey Clinic previous to Jan. 1, 1945. Since that time 38 additional patients have been treated, and some of my most recent experiences will be discussed, because further improvements in technical methods have been made during this period.

No presentation of this subject should be made without particular emphasis on the prevention of benign strictures, since most of them are the result of a surgical accident during cholecystectomy. Furthermore, strictures that result from inflammation or from a stone that ulcerates the duct are preventable if early operative removal of gallstones is urged. The prevention of strictures will be discussed later when the causes of their formation are enumerated.

LITERATURE

During the past decade considerable interest in this subject has been demonstrated by a number of reports. Most of these have been concerned with methods of repair. Walters and his associates,[1] in a series of articles, have reported the largest experience, and a further report was made from the Mayo Clinic by Gray [2] in 1938. Lahey [3] described nine different methods of repairing strictures in a general survey of the problem in 1937. Later experiences from this clinic have been reported by Lahey [4] and by me;[5] we have described the causes and method of repair. Repair of strictures by anastomosis to the gastrointestinal tract was emphasized by Brackin and David,[6] Dragstedt and his associates [7] and Walton,[8] as well as new modifications, by Allen [9] and Cole.[10] The use of vitallium tubes was introduced by Pearse [11] in 1941 and in two subsequent reports.[12] There is general agreement as to the causes of strictures but a wide variation in methods employed for their repair. This suggests that no one method is applicable to all cases, and it is important that further review of experiences be made with particular reference to the results following the different procedures.

INCIDENCE

It is difficult to determine with any accuracy the frequency of strictures of the biliary ducts. Since it is most frequently a complication of previous surgical intervention on the gallbladder, some cases are included in the mortality of that operation, and other patients die subsequently of an obstructive cirrhosis with the underlying condition unrecognized. In over 5,000 gallbladder operations in this clinic only 1 operative stricture has been produced. A relative idea of the frequency can be obtained from the ratio of the number of strictures operated on to the total number of gallbladder operations. In a four year period, 1938 to 1941 inclusive, 909 gallbladder operations were performed, and during this time 19 strictures were encountered, an approximate ratio of 1 to 50, or 2 per cent. In the past eighteen months, however, 38 patients with stricture have been operated on, which represents 8 to 9 per cent of all gallbladder cases. This high incidence resulted in a specially selected group of cases, since all were referred. The ratio of benign strictures to obstruction of the biliary ducts due to cancer is 1 to 2.5.

TABLE 1.—*Age and Sex of One Hundred and Twenty-Three Patients*

Sex	No. of Cases	Age	Cases
Female	99 (80%)	20-29	11
Male	24 (20%)	30-39	26
		40-49	46
		50-59	33
		60-69	6
		70-72	1
		Youngest 21, eldest 72	

There were 99 women (80 per cent) and 24 men (20 per cent) in this series of 123 patients. This high proportion of strictures in women is in excess of that encountered in patients having cholecystectomy.

The age incidence is shown in table 1. Thirty per cent of the strictures occurred in patients under 40 years of age. It seems logical to assume that many of these patients had had disease of the biliary tract for a relatively short period of time, and the operative difficulties should not have been serious. The youngest patient was 21 and the eldest 72.

CAUSES OF STRICTURES

The histories of these patients have been reviewed and the operative findings scrutinized in an attempt to determine the underlying cause for the production

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4. Lahey, F. H.: Satisfactory Substitution of a Rubber Tube for a Destroyed Hepatic Duct Over a Period of Six Years, Lahey Clin. Bull. **3:** 98-101 (April) 1943; Finding the Lower End of the Cut Common Duct in Strictures of the Common Duct, S. Clin. North America **23:** 714-716 (June) 1943; Strictures of the Common and Hepatic Bile Ducts, editorial, Surg., Gynec. & Obst. **80:** 555-556 (May) 1945.

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8. Walton, J.: Reconstruction of the Common Bile Ducts, Surg., Gynec. & Obst. **79:** 57-69 (July) 1944.

9. Allen, A. W.: A Method of Re-Establishing Continuity Between the Bile Ducts and the Gastro-Intestinal Tract, Ann. Surg. **121:** 412-424 (April) 1945.

10. Cole, W. H.: Strictures of the Common Duct, editorial, Surg., Gynec. & Obst. **82:** 104-105 (Jan.) 1946. Cole, W. H.; Ireneus, C., and Reynolds, J.: Ann. Surg., to be published.

11. Pearse, H. E.: Benign Stricture of Bile Ducts Treated with Vitallium Tube, Surgery **10:** 37-44 (July) 1941.

12. Pearse, H. E.: Management of Injuries of Common Bile Duct, New York State J. Med. **44:** 403-404 (Feb. 15) 1944; paper read before the meeting of the American Surgical Association, Hot Springs, Ark., April 1946.

of the stricture. In many cases the previous operative records were available, so that it could be determined definitely; in others the probable cause was decided on and listed from the operative findings in the absence of previous surgical records. Since this method is subject to individual interpretation, some of the causes listed might properly be questioned.

The causes of the strictures are shown in table 2. Patients with congenital obstruction of the biliary ducts are not included in this series.

Operative injury had occurred in 99 patients, or 80 per cent of all cases. Since these injuries must be considered preventable, they will be discussed separately later in the paper. Eleven patients had a stricture resulting from long-standing inflammation of the common hepatic or common bile duct. In some the entire extrabiliary duct system was narrow and fibrotic. Others had localized narrowing and ulceration that was probably the result of the presence of a calculus in the duct. These represent long-standing cases of biliary tract disease and might have been prevented by earlier operative intervention.

Fibrosis and narrowing of the ampulla of Vater accounted for 9 strictures. Insufficient attention has been called to this cause of benign obstruction to the biliary ducts. The frequency of this condition is probably much greater than has been represented in this series. It was usually found in patients with recurrent calculi in the common duct. This cause of obstruction of the common duct is frequently unrecognized and can be determined only by the passage of graduated probes or by transduodenal exploration of the ampulla. Infrequent causes of benign strictures were adhesions in 2 patients and external trauma in 1.

TABLE 2.—*Causes of Stricture in One Hundred and Twenty-Three Patients*

	No. of Cases
Operative injury	99
Cholangitis	11
Fibrosis of ampulla	9
Adhesions	2
Trauma	1
Unknown	1

TABLE 3.—*Site of Operative Injury*

	No. of Cases
Hepatic duct	49
Cystic duct area	23
Common duct	9
Excision of both	18

Operative injury to the ducts was recognized at the initial operation in a number of these cases, but usually the previous operative report contained no description of injury to the duct. The occurrence of hemorrhage during cholecystectomy, usually from loss of the cystic artery, is a common observation. An attempt to control it by the blind use of artery forceps or by mass suture of the area frequently results in injury to the common hepatic duct. This can be avoided by pressure on the hepatic artery, compressing it between a finger in the foramen of Winslow and the thumb anteriorly on the gastrohepatic omentum until the cystic artery stump can be accurately secured. Two other typical stories were given in a review of the operative and postoperative records, both of these following an apparently uneventful cholecystectomy. The first described the profuse drainage of bile from the wound which shortly followed the operation and continued as an external biliary fistula. The second stated that jaundice occurred a few days after operative intervention and became persistent, with acholic stools.

At reoperation, these were usually shown to be caused by obstruction of the common duct at the junction of the cystic duct as a result either of interference with the lumen of the duct because of too close ligature of the cystic duct or of removal of a portion of the duct at this point.

The site of the stricture aids in determining the manner of operative injury and is shown in table 3. The common hepatic duct or both hepatic ducts were injured in 49 patients, many of these patients giving the story of hemorrhage encountered at operation. The lower end of the common duct was injured in a localized area in 32 patients, the common duct being involved just proximal to the duodenum in 9 and in the region of the cystic duct in 23. Excision of large portions of extrabiliary ducts was encountered in 18 patients, and in many of these no remaining duct could be found between the hilus of the liver and the edge of the duodenum.

Strictures produced as a result of operative trauma are preventable. They may be the result of poor anesthesia, with the resultant difficult operating conditions, or failure to recognize the variation of the entrance of the cystic into the common duct, as well as the difficult situation in which a badly inflamed and contracted gallbladder may distort the anatomy. The experience of the surgeon with operations on the gallbladder is a determining factor. Whether the surgeon chooses to remove the gallbladder from below upward or to dissect the gallbladder down to the region of the ducts, it is important that the anatomy be fully demonstrated before the division of any structures is attempted. With the exception of patients with acute forms of gallbladder disease, it is my plan to open the gastrohepatic omentum, secure the cystic artery separately and demonstrate clearly the junction of the cystic duct with the common hepatic and common ducts before removing the gallbladder. Careful demonstration of this anatomy in every case will give the best assurance of avoiding injury to the ducts, but good anesthesia and good exposure are necessary to accomplish this. While cholecystectomy is the operation of choice for all patients with gallstones, it is much better to perform cholecystostomy if the surgeon feels that satisfactory dissection is not possible, rather than to risk possible injury to the duct. Frequent explorations of the common bile ducts during gallbladder operations as practiced in this clinic have not contributed to the formation of strictures.

Since this paper is primarily concerned with the prevention and repair of benign strictures, the diagnosis of the condition will not be included. It will suffice to state that all patients had obstructive jaundice unless an external biliary fistula was present. Internal fistulas into the duodenum were commonly encountered, often resulting in intermittent jaundice as the fistula opened and closed. Common duct stones and malignant obstructions of the duct must be excluded as well as jaundice of intrahepatic origin.

PREPARATION FOR OPERATION

Once the diagnosis of benign stricture is made, the time selected for effecting the repair is quite important. The best chance for success is at the original operation

if operative injury is discovered. The dissection and mobilization of the ends of the duct at this time can be satisfactory, and a good suture can be obtained. If the injury is discovered during the postoperative period, unless the secondary operation is performed within a few days it is better to wait until the inflammation and edema subside in order to have pliable structures with which to deal. Many of the failures are the result of too early intervention. If an external biliary fistula persists, there is no urgency and the operative procedure should be delayed for at least three months. If obstructive jaundice persists throughout the postoperative period, such a delay cannot be tolerated and reoperation should be done in four to six weeks. If too early operation is attempted further portions of the duct system may be destroyed, as each attempt at repair that is unsuccessful makes further procedures more hazardous. In an editorial on this subject Dr. Lahey called attention to the many difficulties encountered and suggested that it usually would be better for the surgeon who had the misfortune to produce a stricture to refer the patient to one of the many surgeons who had had considerable experience in the repair of strictures. His opinion was based on the fact that many of the patients encountered had had multiple operations, and in 1 patient eight previous procedures had been performed.

A short period of preoperative preparation will suffice for those patients who have an external biliary fistula. Those who have severe obstructive jaundice, however, require a period of two to three weeks to get them in the best possible condition. A high caloric, high protein, low fat diet is best tolerated. This should be augmented by adequate vitamin therapy, particularly vitamin B complex, ascorbic acid and vitamin K. The last mentioned should be given parenterally in excessive doses, with or without the oral administration of bile salts. Four milligrams of "hykinone" (menadione sodium bisulfite) given twice daily subcutaneously or with intravenous fluids should suffice. Intravenous dextrose solutions, amino acids and blood transfusions may be required for a short period previous to operative intervention.

In view of the technical difficulties usually encountered and because of the length of time required for the repair, I employ fractional spinal anesthesia, utilizing tetracaine hydrochloride weighted with dextrose solution. This gives the best operating conditions possible for whatever time may be required. If general anesthesia is preferred, intratracheal cyclopropane supplemented with curare to aid in relaxation may prove satisfactory.

OPERATION

The seriousness of this problem is clearly shown by the number of operative procedures carried out in this series of 123 patients. A total of 344 operations was performed, 180 of these having been done previous to the patients' admission to this clinic. This figure includes 57 previous repairs of stricture before the patients came under observation here. There were 164 operations for repair performed, which included 32 repeat operations. The extent and number of the surgical procedures are only part of the picture. Severe hepatic damage was present as a rule, and long periods of disability with economic loss resulted from the stricture formation.

There are two general plans for the operative repair of stricture. The first includes the plastic procedures and end to end suture for restoration of the continuity of the duct itself, preserving the sphincter of Oddi and the normal entrance of the biliary passage into the duodenum. The second method of repair, usually employed when portions of the duct system are missing, consists of the suture of the proximal end of the duct to some portion of the gastrointestinal tract—stomach, duodenum or jejunum. All methods of repair are modifications of one of these two methods.

The general principles underlying a successful repair are listed in table 4, and these apply to either of the general methods of repair. The most important principle is accurate approximation of mucosa to mucosa in any type of anastomosis, whether this be duct to duct or duct to gastrointestinal tract. This must be obtained without tension; in order to accomplish this, adequate mobility of the two ends is essential. Every attempt should be made to avoid leaving any defect in the biliary duct, as operations utilizing a tube to bridge a defect have given poor results. The repair should be performed over a mold or tube, and this should remain in place for a period of several months whenever possible. This maintains an adequate opening during the initial healing period as well as during the final reparative process, when fibrous tissue is absorbed after several months.

TABLE 4.—*Principles of Treatment*

Mucosa to mucosa in any anastomosis
Accurate approximation without tension
Insert T tube through a separate incision in the duct
Indwelling biliary duct tube is anchored
Avoid leaving defects in the biliary ducts
Prolonged tubal drainage is essential after repair

TABLE 5.—*Type of Operation: First Series, Eighty Patients*

		No. of Operations
External fistulas performed		7
External fistulas transplanted		8
Defects bridged by tube		3
Dilatation and tube implantation		19
Plastic repair		22
End to end suture		20
Hepaticodochogastrostomy		14
Stomach	2	
Duodenum	6	
Jejunum	6	
Division of band		1
Total, 80 patients		94

If a T tube is used, the vertical limb should be brought out through a separate incision in the duct, making the repair over the horizontal limb.[13] If a tube is implanted within the duct it should be anchored. If the tube passes through the ampulla of Vater it will pass in most instances. Likewise, most tubes will pass irrespective of anchorage if the duct is anastomosed to the gastrointestinal tract.

RESTORATION OF THE CONTINUITY OF THE BILE DUCTS

Whenever possible, a method of repair should be employed which restores the continuity of the duct and preserves the sphincteric action at its entrance to the duodenum. In the past insufficient emphasis has been placed on methods which will accomplish this. As a result of the experience reported here, far better results will be obtained in the future. Because of the technical difficulties involved in finding the lower end of the duct when portions of the duct have been excised, the

13. Cattell, R. B.: A New Type of T-Tube for Surgery of the Biliary Tract, Lahey Clin. Bull. 4: 197-204 (Jan.) 1946.

surgeon has been content to anastomose the proximal end of the duct to the gastrointestinal tract. There is no question that this is the easiest method, since the distal end of the duct is collapsed, contains no bile and is buried in scar tissue. With an increasing experience with strictures, it has now been found that it is possible

TABLE 6—*Type of Operation—Second Series, Forty-Three Patients*

		No. of Operations
Dilatation		8
Plastic repair		2
End to end suture		31
Hepaticoenterostomy		14
Duodenum	6	
Jejunum	8	
Tube implantation		1
Fistula transplantation		0
Total, 43 patients		56

to obtain adequate portions of the distal duct even when none can be demonstrated beyond the duodenum or head of the pancreas. In my opinion one of the greatest improvements in effecting a repair has been a procedure which mobilized the duodenum and the pancreas fully, permitting it to be drawn forward and turned to the left so that the posterior portion of the pancreatic head can be visualized. The anterior division of the superior duodenal artery can then be sectioned and the pancreas split so that the intrapancreatic portion of the common duct can be identified and dissected free for a distance of 2.5 to 5 cm. Care must be taken not to free the left side of the duct near the ampulla in order to avoid injury to the pancreatic duct. The mobility of the duct, head of the pancreas and duodenum which is thus obtained permits its approximation to a short common hepatic duct stump at the hilus of the liver, and this can be accomplished without tension. During the past seventeen months 38 patients with strictures have been operated on in addition to the series reported in this paper, and it has now been demonstrated that it is possible to do end to end suture of the ducts irrespective of the amounts that had been previously excised or can no longer be used for repair. Particular attention is called to this procedure because this method, which permits restoration of continuity of the duct, has given the best results. It must be admitted that this is a difficult technical procedure, but with increasing experience it has been accomplished with less difficulty.

Since there has been a considerable change in the operative treatment of benign strictures, this series of

TABLE 7.—*Operative Mortality*

No. of Patients	Mortality No.	Mortality %
80	14	....
43	3	....
123	17	13.8

cases has been divided into two groups. Eighty patients were operated on prior to 1940 and 43 from 1940 to 1944, inclusive (tables 5 and 6). The chief difference in the two series is the great increase in the number of end to end sutures following excision of the stricture. Transplantation of fistulas has been discontinued. There were 14 anastomoses of the duct to the gastrointestinal tract in each series. In the more recent group of 38 cases not included in this study, anastomoses of the duct to the gastrointestinal tract have been discontinued, with rare exceptions.

The type of material over which the repair is performed is not as important as the way the procedure is carried out. It is important, however, to have as large a lumen in the tube as possible in order that it will not become encrusted with bile salts or pigment. The best repair of the duct in my experience is performed over the horizontal limb of a T tube brought out through a normal portion of the duct. Unfortunately, this is possible only when considerable portions of the duct remain. When large portions of the duct have been excised the use of the vitallium tube, which has been described by Pearse, has been satisfactory. It was used in 30 patients in this series of 123 repairs and has been employed in 14 additional patients during 1945 and 1946. Indwelling tubes, some form of French catheter or black rubber tubes have been used in a number of cases. More recently, Dr. Lahey has employed a new tube of bouncing clay, with satisfactory results. When a T tube has been used it has been left in place for from six to twelve months, and I prefer the longer period.

TABLE 8.—*Hepaticogastrointestinal Anastomosis (Results in Twenty-One Patients)*

Well	12
Improved	4
Unimproved (8 reoperated)	9
Deaths	4
Total	29

TABLE 9.—*Results of Vitallium Tube Repair*

	Duct Repair	Duct to Gastrointestinal Tract	Total
Well	17	5	22
Improved	2	1	3
Failure	2	0	2
Deaths	2	1	3
Total	23	7	30

ANASTOMOSIS OF THE DUCT TO THE GASTROINTESTINAL TRACT

This method of repair was performed in 14 cases in each series, or a total of 28 patients. In the first group the proximal duct was anastomosed to the stomach in 2 cases and to the duodenum and jejunum each in 6 cases. In the second series no anastomosis was done to the stomach, since it was considered an unsatisfactory method. The duct was anastomosed to the duodenum in 6 cases and to the jejunum in 8 cases. I consider hepaticojejunostomy the procedure of choice if this method of repair is chosen. Hepaticojejunostomy is carried out by bringing a long loop of jejunum in an antecolic position and anastomosing the duct approximately 25 cm. from the ligament of Treitz. It should always be accompanied by enteroenterostomy. The Y loop or Roux principle has not been utilized for these anastomoses, although other surgeons have found it satisfactory. Allen described an ingenious method for repair, utilizing such a defunctionalized loop of jejunum, and modified it by turning in the serosa and anastomosing it to the proximal duct, with a temporary catheter brought out through the anastomosis. Cole utilized a similar method but produced a valve by enfolding the defunctionalized loop of jejunum to prevent reflux. The type of material over which this anastomosis is performed makes little difference since all will pass.

I have employed the de Pezzer catheter, an ordinary black rubber tube with a flange, as well as vitallium tubes. The latter were used in 7 patients, and in 6 the tube passed within a short period of time. Vitallium offers no particular advantage in this method of anastomosis.

POSTOPERATIVE TREATMENT

The postoperative treatment is similar to that of any serious abdominal operation. The parenteral administration of vitamin K is continued, and the prothrombin time is followed. Large amounts of intravenous dextrose, amino acids and blood transfusions are used as necessary. Vitamin K therapy should be continued for at least one week after operative intervention. Drainage of bile from the wound is commonly encountered, but if an effective repair has been obtained, it should stop within a period of two weeks. Bile salts are given during the first week. A cholagogue is continued for several months postoperatively when a tube remains within the duct system. If a T tube has been used it is irrigated twice a day after the first week, and this is continued for an indefinite period.

The operative mortality is shown in table 7. In the first series of 80 patients, 14 deaths occurred. In the second series of 43 patients there were 3 deaths. This reduction in mortality is largely the result of better preoperative preparation and particularly of the reduction of postoperative bleeding or hemorrhage by the use of vitamin K. An increasing operative experience with cases of this type has been a factor in reducing the mortality.

RESULTS

No detailed analysis of the results will be presented. The longer these cases are followed, the more recurrences of symptoms will be noted. In table 8 the results of anastomosis of the duct to the gastrointestinal tract in 21 patients who have been followed are shown, follow-up data not being available in the other 7 patients. Only 12 obtained a completely satisfactory result, while 4 were improved but had infrequent attacks of jaundice or fever. Nine were unimproved, and of this number all but 1 were reoperated on. There were 4 deaths in this selected group.

In table 9 the 30 patients who had a vitallium tube repair are listed. Seven of these had the duct anastomosed to the duodenum or jejunum, while 23 had an end to end repair of the duct over a vitallium tube. There were 2 deaths in the latter group, and satisfactory results were obtained in 19 cases. It was necessary to remove the tube in 2 of these cases as well as in a subsequent case not included in this series. In 2 patients the tube, in spite of its flange and anchorage, passed through the common duct into the duodenum.

The most satisfactory results followed end to end repair of the duct or plastic repair of the duct over a T tube. In both these procedures accurate approximation of the duct without tension can be obtained and the tube can subsequently be removed.

SUMMARY

A series of 123 benign strictures of the biliary ducts is reported. Eighty per cent were the result of operative injury.

The prevention of strictures is emphasized. Good anesthesia, adequate exposure and a careful anatomic dissection are prerequisites for the avoidance of this complication.

Two general methods of repair are available: first, anastomosis of the proximal end of the duct to the gastrointestinal tract and second, restoration of continuity of the duct by suture over a tube, preserving the normal sphincteric action at the lower end of the duct. The type of material used for the repair is less important than accurate suture without tension.

Repair of the duct is the method of choice and gives the best results. Anastomosis of the duct to the duodenum or jejunum can usually be avoided.

A method to obtain the portion of the distal duct by splitting the pancreas in patients in whom a large portion of the duct has been removed is described.

One hundred and sixty-four operations were done on 123 patients, with 17 deaths, a mortality of 13.8 per cent.

The best method of repair of the duct is by utilizing a T tube. When this is impossible, the use of an indwelling tube, either of rubber or of vitallium, may be satisfactory. Recurrence of stricture may take place at any time and require reoperation.

ABSTRACT OF DISCUSSION

DR. H. GLENN BELL, San Francisco: One point might be added for the prevention of a stricture in the removal of the gallbladder, a procedure in which the common duct has to be opened and drained. Whenever possible, if the common duct is drained through the cystic duct so that the primary opening of the common duct can be closed, this may lessen the chance of the patient getting a stricture. It requires judgment to know when to explore the common duct. Some patients have a stricture of the common duct because the duct was explored and probed, reprobed and dilated when it had nothing in it and when the wall was nothing more than chronic inflammatory tissue, which would probably have fuctioned very well if the duct had not been traumatized. I have had the same experience that Dr. Cattell has had; some patients have had up to six operations before I see them and, as Dr. Cattell modestly said, these cases are very difficult. I agree that an end to end anastomosis of the common duct is the one procedure of choice, and when one realizes how many methods have been described, it is apparent that no one method will apply to every single case. Dr. Cattell's method of increasing the amount of the common duct distally by rolling the head of the pancreas to the left and exposing it to get 2.5 to 5 cm. of distal duct is extremely ingenious and certainly will make it more possible to do the end to end anastomosis. The method of anastomosis of the proximal common duct to the gastrointestinal duct, with mucosa to mucosa, over a rubber tube or a vitallium tube, is the next procedure of choice. I have had to remove some vitallium tubes which had become plugged with inspissated bile.

DR. FRANK H. LAHEY, Boston: A great many strictures of the biliary ducts are caused by hemorrhage from the cystic artery or from the hepatic artery. They are the result of large accumulations of blood in a deep cavity. With a poor light and inadequate exposure, in despair, the worried surgeon blindly places a clamp on the bleeding point, a procedure which, if it controls the hemorrhage, always will include either the hepatic duct or the common duct. If one could teach these surgeons that a few precautions would avoid this—wide incisions, good light and the retraction of the duodenum to the left, which puts the common duct on the stretch and which visualizes the foramen of Winslow, even so that the vena cava can be seen on its back—I am sure that these accidents would not occur. It is pertinent to recall how easy it is to control these hemorrhages from the cystic or hepatic artery even if they occur. If the surgeon will only put his finger in the foramen of Winslow and lift up or put his thumb on the artery, the hemorrhage will be immediately controlled so that the clot can be wiped out, the bleeding point accurately found and ligated and the injury to the duct avoided. There are a few things that ought to be stressed about duct strictures; that is, since surgeons have learned to find the lower end of the common duct in every stricture, the problem has been simplified, even if not solved. This is the method that was learned in doing partial gastrectomies—the mobilizing of the duodenum, turning

it over to the left and splitting the lower edge of the pancreas. There one will always find a good section of common duct because it is so situated behind the duodenum that it is impossible to injure it at the time of the cholecystectomy. This makes possible the end to end anastomosis which Dr. Cattell has stressed and which can be accomplished only when the lower end of the common duct has been mobilized. Long ago I proposed that when these end to end anastomoses are done and the T tube is inserted, it should not be brought out through the suture line, because when it is removed it will tend again to produce strictures. It should be put in through a separate incision above, and when it is withdrawn the end to end anastomosis remains intact. As to vitallium, all have misinterpreted the value of these tubes. They do have the advantage of being tolerated by the tissues because they are nonelectrolytic, but they have no advantage over any other tube in their ability to be plugged. The whole problem of implantation of tubes is, do they plug? Some of them plug regardless of the material used. I have now for some time employed a material called "bouncing clay," which was developed by the General Electric Company. It is a silicon which has all the qualities of rubber. It will stretch, it will bounce, it is flexible, it can be cast so that its caliber is of any size, it can have shoulders or bumps put on it so it will not pass, and it has the great advantage of fitting the tortuous channels that one has to deal with in these strictures.

DR. RICHARD B. CATTELL, Boston: Both Dr. Bell and Dr. Lahey emphasized that strictures are preventable. Adequate exposure and careful dissection of the cystic artery and cystic duct before their division will avoid injury. Dr. Bell raised the question that frequent exploration of the common duct might result in a higher incidence of stricture. This has not been true in my experience. In approximately 5,000 gallbladder operations at the Lahey Clinic the common duct has been explored in 1,800 patients and only 1 stricture has occurred, and in this patient the duct was not explored. If exploration of the common duct is indicated and the surgeon's experience justifies it, it can be done without any increase in the incidence of stricture formation.

APPRAISAL OF SURGERY IN THE TREATMENT OF BRONCHIECTASIS

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This report is an analysis of 50 consecutive, surgically treated cases of bronchiectasis at the Lahey Clinic in the five year period ending August 31, 1945. There has been no death, either in the hospital or during the follow-up period, and the series again confirms the prediction of early workers in thoracic surgery that invalidism from bronchiectasis may be cured and functional usefulness restored by appropriate pulmonary resection. In space of time covered, this five year period may be considered that in which thoracic surgery came of age. These years encompass those patients who received the benefits of improved surgical technic, effective chemotherapeutic agents and more seasoned judgment in clinical management. Granted that the care of bronchiectatic patients cannot be regarded as perfect until the disease is prevented from occurring, it would seem appropriate at this time to record the observations, practices and results emerging from one carefully studied group of cases.

From a socioeconomic viewpoint, bronchiectasis is an important pathologic entity, and no method of therapy has been more beneficial to bronchiectatic patients in altering their social destiny than surgical treatment of the disease. In order to comprehend fully the ramifying aspects of bronchiectasis, the social and psychologic distress found in such patients should be investigated as well as the purely physical manifestations. With this knowledge aforethought, and the fact that surgery offers a cure in most instances, the surgeon's role in reconstructing the social, psychologic and physical outlook of patients with bronchiectasis is self evident.

The opportunity to observe the sad result of chronic illness on character and life itself falls within the experience of every physician. The alterations in personality caused by physical distress have led psychologists to postulate a definite temperament resulting from physical deformity. There can be little doubt that a prolonged struggle against chronic disease may influence the character and career of any man. Patients with bronchiectasis often fall into this category. By the general public, these patients are branded as having tuberculosis. Oftentimes they have been studied in vain for tuberculosis; sometimes they have spent prolonged periods of time in tuberculosis sanatoriums. In the young, schooling is neglected because illness renders the child unable to keep pace with his classmates. With expressive but cruel wit, one child with a chronic cough was nicknamed "The Barker" by his fellows and another with foul sputum "Stinky," and they thenceforth attended school only under duress. The antisocial pattern may be more clearly defined in the late teens, when social contacts are made only under the handicap of a productive cough or foul sputum. The young man may be unable to hold his job because of recurring respiratory infections or chronic fatigue. The young woman may worry about scanty menstruation or suspected personal unattractiveness. Marriage is frequently postponed. If entered into, lack of libido and interruption of normal marital relationships by the necessity of cough and evacuation of sputum often strain the bonds of happy marriage. The increasing responsibilities of life in the late twenties and early thirties and the decrease of the recuperative powers of youth account for the large number of bronchiectatic patients who "break down" in this age period. Thus it can be appreciated that the social, economic, mental and physical aspects of bronchiectasis make this a subject of paramount concern.

ETIOLOGY

No one cause can be indicted in the etiology of bronchiectasis. Many factors may be incriminated, singularly or collectively, in the development of the disease. Among the most common contributing causes are:

I. Diseases of the accessory air passages
II. Respiratory infections and infectious diseases
  (*a*) Recurrent bronchitis, acute and chronic
  (*b*) Pneumonia
  (*c*) Measles, influenza, whooping cough, scarlet fever
III. Congenital malformations
  Cystic disease of the lung
IV. Bronchial obstruction
  (*a*) Foreign body
  (*b*) Hyperplasia of mediastinal lymph nodes
  (*c*) Carcinoma or adenoma of bronchus
V. Emphysema, atelectasis
VI. Situs inversus and sinusitis

From the Lahey Clinic.
Read before the Section on Surgery, General and Abdominal, at the Ninety-Fifth Annual Session of the American Medical Association, San Francisco, July 5, 1946.

From this categorization it can be realized that the basic mechanisms in the development of bronchiectasis are two: infection of the bronchial wall and bronchial obstruction. When disease of the nasal sinuses acts as a nidus for the production of chronic inflammation of the bronchial walls, damage, even destruction, of the musculoelastic tissue may occur. This is followed by loss of resiliency in the bronchial segment involved and dilatation of that segment. Dilatation of this type is conducive to an accumulation of secretions. The secretions may remain incarcerated in the bronchi for prolonged periods, with associated secondary infection.

The initiation to the development of bronchiectasis may be an acute infection of the upper respiratory tract, bronchitis or the diseases of measles, influenza, whooping cough or scarlet fever. In 31 of these cases, the basis on which bronchiectasis developed was found in causes of this category. In 10 cases bronchiectasis was a sequel to bronchopneumonia. In 6 cases the onset was insidious and lacking of a definitive or determinative cause.

Congenital defects in the bronchial tree have been mentioned as a basis for bronchiectasis. This thought is postulated in conjunction with cystic formations in the lung which appear to be true structural malformations. Often this is closely simulated by cystic bronchiectasis associated with bronchial stenosis. One of these patients had cystic bronchiectasis of an upper lobe, but it was not possible to determine whether the cystic disease or the bronchiectasis appeared first.

Obstruction to a bronchus may easily result in bronchiectasis. This occurs because of the interference with normal bronchial drainage. Foreign bodies, adenoma or carcinoma obstructing the bronchial lumen, or extrinsic bronchial compression often are factors in the production of bronchiectasis. Cases of bronchiectasis secondary to tumors are not included in this report. One of our patients had a peanut lodged in his bronchus at age 1. He coughed for the next nine years and finally had a left lower lobectomy for bronchiectasis, with alleviation of his symptoms.

Emphysema and migratory atelectasis have been incriminated as predecessors to the formation of bronchiectasis. Both of these fall into the category of obstruction to bronchial passages, with the related increase in intrabronchial pressure resulting in distention of the bronchus. Such bronchiectasis shows a tendency to be tubular rather than saccular in type and is largely related to the emphysematous state. Such cases are not true bronchiectasis and are not included in this study. Tuberculous ulcers of the bronchus are a potent source of local bacterial contamination and inflammatory bronchial obstruction which might antedate the onset of bronchiectasis, but this occurrence is more properly considered as a complication of endobronchial tuberculosis.

One of us reviewed 23 cases of situs inversus at the Massachusetts General Hospital,[1] in 5 of which there was bronchiectasis as well as associated diseases of the accessory air passages. One of the cases in the present group fulfilled the requirements of that syndrome: situs inversus, sinusitis and bronchiectasis.

Mention should be made of pseudobronchiectasis[2] which has been reported following pulmonary infections—especially virus pneumonia. In some cases following pneumonia roentgenographic evidence of bronchiectasis has appeared and then disappeared in one or two months as silently as it was developed; hence the name "pseudobronchiectasis," or "reversible bronchiectasis." A more appropriate name for this condition would be "transitory bronchiectasis." No such cases are here included.

From this brief discussion of the etiology of bronchiectasis it is apparent that causative factors are equally as interesting as the disease itself.

PATHOLOGY

The foundation on which bronchiectasis forms is bronchial infection and obstruction. Initially, the pathologic process commences with hyperemia and thickening of the mucosa, which results from infection. Eventually the mucosa may protrude into the lumen as papillary projections. These projections are extremely vascular, and from this source hemoptysis may arise. From dilatation peripheral to an obstruction, cylindrical bronchial enlargement or cavitation is produced. By continuation of the pathologic process the lung parenchyma is replaced by fibrous tissue. When a previously formed cavity harbors infection, purulent material is accumulated and offensive odors are associated with secondary invasion by putrefactive organisms. On occasion the formation of secondary pulmonary abscesses results. This is an infrequent occurrence, produced when septic material becomes sufficiently localized to cause sequestration of pulmonary tissue.

The histologic picture in bronchiectasis is one of inflammation, proliferation and destruction of tissue. The bronchial wall is infiltrated with leukocytes and lymphocytes. If the disease is of long duration, the glands, muscle fibers, elastic tissue and often the cartilage may be replaced by fibrous tissue. The epithelial lining is the last to be involved, and although its continuity may be disrupted its identity remains. Perforations in the bronchial wall may occur. If the blood vessels in the wall become greatly dilated and rupture, a second potential source of hemoptysis is present. In the event that these vessels become thrombosed, the thrombus may produce an infected embolus resulting in a metastatic brain abscess. From recurring episodes of bronchopneumonia the adjacent pulmonary tissue becomes infected, and later fibrotic. This situation produces peripheral zones of compensatory emphysema.[3]

A cough present from birth may indicate congenital bronchiectasis. The lung in such instances may have many cystlike cavitations. These cysts are lined with a layer of epithelium, flattened or cuboidal, which may be ciliated. This pathologic entity may be rightfully termed congenital cystic disease of the lung. It must be remembered that formation of a cyst in the lung that appears to be a true structural malformation may be closely simulated by cystic bronchiectasis associated with bronchial stenosis.

Bronchiectasis may be limited to one or more bronchopulmonary segments within a lobe, other segments of the lobe being normal. Although the lower lobe of the lung is the site of most frequent involvement by bronchiectasis, there is a striking tendency for the disease to be localized to the basal division and for the dorsal division to be spared. This fact stands in sharp contrast to the localization of putrid pulmonary abscess, which is found with greater frequency in the

1. Adams, R., and Churchill, E. D.: Situs Inversus: Sinusitis, Bronchiectasis; Report of Five Cases, Including Frequency Statistics, J. Thoracic Surg. **7**: 206-217 (Dec.) 1937.

2. Blades, B., and Duggan, D. J.: Pseudobronchiectasis, J. Thoracic Surg. **13**: 40-48 (Feb.) 1944.

3. Boyd, W.: Surgical Pathology, ed. 5, Philadelphia, W. B. Saunders Company, 1942, p. 782.

dorsal division of a lower lobe than in any other single location. Bronchiestasis may also be multilobar in its distribution. Because of this tendency of the disease toward selective localization the rationale for proposing the resection of the involved bronchopulmonary segment is justified. This principle of segmental resection finds special merit in early cases of bronchiectasis and in those patients with bilateral disease. In 2 cases of this series, the lower lobe was divided with removal of the diseased basal division, and preservation of the anatomically normal and functionally useful dorsal division.

By the time bronchiectasis is diagnosed the disease usually has reached its greatest pathologic status. It is not believed that bronchiectasis spreads insidiously from lobe to lobe. Occasionally bronchiectasis may spread after an acute pneumonitic episode, but our observations are in agreement with those of Churchill and Belsey.[4] "In general, however, the anatomic pattern of the disease remains static over long periods of time. Although the symptoms may vary, any attempt to explain an unsatisfactory surgical result on the basis of postoperative extension of the disease appears contrary to the observed facts of preoperative pathology. . . . The disappointing clinical results of some lobectomies can be explained by the failure to appreciate the high incidence of residual disease in an unresected lingula."

COMPOSITE CLINICAL PICTURE

The manifestations of bronchiectasis are more protean than the local pathologic entity would indicate. A type of inhibited personality encountered in patients with bronchiectasis has previously been mentioned. Such an alteration may be attributed to the serious, mentally disturbing social handicaps of a foul breath and an uncontrollable, productive cough. Patients in whom bronchiectasis develops in childhood rarely live beyond their fiftieth birthday without treatment.[5] The chronicity of their disease and the associated secondary respiratory complications frequently limit their work to an inefficiency level. Such a situation often ends in unemployment, poverty and personality problems. In the clinical picture of bronchiectasis it must be remembered that when bronchial dilatation alone is present symptoms may not be in evidence. However, episodes of hemoptysis of variable degree may occur. The term "dry or hemorrhagic bronchiectasis" has been applied to such cases. When chronic infection is pronounced, the chief symptoms are cough and purulent sputum. These symptoms usually are more evident in the morning because of accumulation of the purulent secretions during the night. In extensive disease, producing widespread destruction of pulmonary tissue, dyspnea on exertion may be present.

Physical signs vary according to the extent of the secondary phenomena of infection and atelectasis. Dulness, diminished breath sounds and moist rales over the involved pulmonary segments are positive findings. Dry bronchiectasis may yield no detectable sign even though an entire lobe be completely collapsed.

The presence of clubbed fingers in patients with long-standing disease may be a noticeable sign.

Roentgenography and bronchography are valuable aids in the diagnosis and evaluation of the extent of bronchiectatic disease. The roentgenologic findings of collapse, dilated bronchi and compensatory expansion of adjacent pulmonary tissue are characteristic. Fluoroscopy and lateral views are desirable, as the ordinary posteroanterior roentgenogram will often fail to reveal the shadow of an atelectatic lower lobe lying in the costovertebral gutter behind the heart.

Although bronchography is only rarely indicated or necessary in order to establish a diagnosis of bronchiectasis, it is, nevertheless, essential to a critical study of the pattern of the disease process. The extent of bronchiectasis can be accurately determined if bronchography is performed in such a way that every segment of the lung suspected of harboring the disease is outlined. A complete study of this type, adequately interpreted, permits a practical program to be outlined for the satisfactory surgical treatment of the disease. A simple, effective technic of bronchography which is safe for use by the general practitioner has been described by one of us.[6] A word of caution is not amiss, however, in calling attention to the danger of bronchography in the presence of emphysema.

SELECTION OF CASES AND PREPARATION

The advancement in pulmonary surgery has been accompanied by a remarkable diminution in operative mortality. As surgical experience increased it became evident that almost every patient with bronchiectasis who is a satisfactory operative risk should have the diseased pulmonary tissue resected. The operation of necessity temporarily jeopardizes the reserve capacity of the respiratory and circulatory systems. This reserve is initially endangered because the bronchiectasis has already diminished the physiologic efficiency of these vital systems. Bilateral bronchiectasis entails operative dangers out of proportion to the mechanical extent of the disease. Rarely do patients who have passed beyond the middle of life's span have sufficient reserve to warrant surgical intervention. Advanced emphysema and fibrosis may present intolerable deficiencies of blood oxygenation to the heart and the brain. Persons with chronic asthma have proved poor candidates for thoracic surgical procedures. The ravages of long-standing bronchopulmonary suppuration, sometimes complicated by empyema, cause nutritional, hemic and vitamin depletions that preclude operative success until they are corrected.

Patients under 50 with unilateral disease limited to one collapsed lobe, with infection temporarily quiescent and who are otherwise in good physical condition, constitute the best candidates for surgical treatment. Many patients whose condition is less favorable have been and can be subjected to a surgical regimen with satisfactory results, but at a greater risk.

In the preoperative preparation of the patient with bronchiectasis, it must be remembered that pulmonary resection is not an emergency but an elective procedure in point of time. For this reason, the patient should be subjected to operation under the most propitious circumstances, and should be operated on only when he is in the best attainable physical condition. Both general and local measures are employed in order to achieve this objective. The candidate for operation is placed on a nutritious diet with the addition frequently of iron and vitamin therapy, stated daily periods of rest and graded exercise. Postural drainage is carried

4. Churchill, E. D., and Belsey, R.: Segmental Pneumonectomy in Bronchiectasis: Lingula Segment of Left Upper Lobe, Ann. Surg. **109:** 481-499 (April) 1939.

5. Perry, K. M. A., and King, D. S.: Bronchiectasis: Study of Prognosis Based on Follow-Up of Four Hundred Patients, Am. Rev. Tuberc. **41:** 531-548 (May) 1940.

6. Adams, R., and Davenport, L. F.: Technic of Bronchography and System of Bronchial Nomenclature, J. A. M. A. **118:** 111-116 (Jan. 10) 1942.

out at least twice daily and is supplemented by aspiration bronchoscopy at intervals if necessary. Associated pleural infections are given dependent drainage, and resection is postponed until active infection is at a minimal stage. Treatment of sinus infection and other disorders of the accessory air passages should precede pulmonary resection. Especially is this true if the sinuses are actually blocked and filled with pus. The surgical procedure should be planned, so far as possible, for a season when epidemic respiratory infections are least prevalent.

One of the sulfonamide compounds, usually sulfadiazine, is given orally for at least twenty-four hours preoperatively, and sometimes for a week or more, in a dosage of 1.5 to 4 Gm. daily. Since the advent of commercially available penicillin, it has been used as a preoperaitve measure to diminish infection. Patients with large amounts of purulent sputum, a febrile type of temperature chart, leukocytosis, rapid sedimentation rate or a recent exacerbation of the disease may be given penicillin for as long a period as two weeks. The drug is administered preoperatively either intramuscularly or by inhalation. The inhalation method may be employed to augment the effects of penicillin given intramuscularly. When given by inhalation, 20,000 units of penicillin is dissolved in 1 cc. of isotonic solution of sodium chloride and given five times daily. The inhalation route is especially beneficial in patients with large volumes of thick purulent sputum.

OPERATION AND POSTOPERATIVE CARE

The operative technic at present employed has previously been described by one of us.[7] The technical details need not be repeated here, but a few principles can profitably be reemphasized. Incomplete fissures should be completed by gentle, careful dissection until the hilus is reached in order to minimize injury to pulmonary tissue and to reduce the likelihood of traumatic pneumonitis. Even when dividing a lobe (segmental pneumonectomy) we have several times found that the parenchyma can be separated along a segmental septum well down toward the hilus without the use of clamps. The hilar vessels should be individually exposed, anatomically identified and divided between ligatures. The bronchus should be isolated, so that it stands clear of all arteries, veins and parenchymal tissue, and closed in a meticulous fashion. No other feature of technical progress has equaled in importance the knowledge of how to close the bronchial stump so that it probably will heal promptly and without even a temporary fistula. Our personal preference indicates an infolding of the posterior membranous bronchus into the anterior cartilaginous portion with two rows of fine interrupted silk stitches, buttressed by a pedicle flap of parietal pleura or a free graft from the fascia of the serratus magnus muscle. The free lung graft and pedicle flap of lung are effective means of providing collateral support to the bronchial stump closure, but are no longer used. They possess the disadvantage, theoretically at least, of increasing the hazards of postoperative infection. The tourniquet technic of lobectomy, useful and valuable as it was in an earlier period, should now be considered only as a method of historical interest.

The immediate requirements following pulmonary resection are to prevent shock or anoxemia and to facilitate expansion of the remaining lobe or lobes. These objectives are accomplished by preventing accumulation of fluid in the pleural space, and by removal if it occurs. Secondly, obstruction to the bronchial tree must be prevented, for this is another possible source of pulmonary collapse (atelectasis).

Blood transfusion and oxygen therapy have been used in every case. A negative intrapleural pressure is maintained through an intercostal drainage catheter. The catheter is removed when the effusion becomes clear and serous, usually about the third postoperative day. Opiates are used sparingly, and efforts to raise bronchial secretions by voluntary coughing are encouraged. Fluids are administered by the parenteral route judiciously when indicated. If secretions accumulate which the patient cannot eliminate, catheter or bronchoscopic aspiration is employed.

The chief complications to be feared are infection and empyema. Empyema is still the most frequent complication following pulmonary resection, although it fortunately has not occurred in the past eighteen months in this series. Since the general abandonment of the tourniquet or mass ligature method of treating the hilus, the frequency of empyema has decreased. All these resections were done with individual ligation of the hilar structures. The most beneficial aids in eradicating postoperative infection are effective closure of the bronchial stump, administration of the sulfonamide compounds, both locally and parenterally, and more recently penicillin.

Penicillin has been administered routinely in a dosage of 40,000 units intramuscularly every three hours. It is discontinued as a prophylactic measure when temperature, pulse rate, leukocyte count and sedimentation rate are within normal limits. Another criterion for discontinuing the drug after lobectomy is complete reexpansion of the remaining lobe or lobes and obliteration of the pleural space. With complete expansion the possibility of empyema is diminished. Usually the drug is administered for about one week.

If delayed development of empyema is feared, penicillin is given intramucularly for a longer time. In addition, daily intrapleural instillation of 100,000 units of penicillin in 20 cc. of isotonic solution of sodium chloride may be employed until the pleural effusion has subsided. The classical indications for surgical drainage are to be followed if the effusion should become purulent. Penicillin is deposited in the pleural space after each paracentesis. When paracentesis is performed it is always desirable to remove as much fluid as possible before instilling the penicillin. If atelectasis should occur postoperatively, bronchoscopic aspirations may be followed by the introduction of 20,000 units of penicillin into the tracheobronchial tree.

This study has revealed that bronchiectasis is essentially a disease of young adults. Forty-five of our patients contracted the disease before reaching the fifth decade of life. Hence the complex social problems usually confronting young adults were intensified in these patients who carried the burden of an inhibiting disease. Almost all of these patients had some major or minor social, economic or mental problem. The disappearance of these problems paralleled the improvement in their health.

An analysis of the symptoms presented categorized the major complaint as cough (in 47 cases) productive of foul sputum (in 43 cases). Hemoptysis occurred in 21 patients and was more frequent in those persons with long-standing bronchiectasis. The complaint of dyspnea was recorded in 11 patients who also had been

7. Adams, R.: Surgical Treatment of Bronchiectasis, S. Clin. North America **22**: 687-701 (June) 1942.

afflicted with the disease for many years. Pain in the chest was a proffered symptom in 16 patients; these, too, had suffered from the disease for many years. Clubbing of the fingers was noted in 5 patients, all of whom had known symptoms of the disease for five or more years.

Salient Features in Fifty Consecutive Operative Cases

Age, Yr.	**Cases**	**Sex**	
1- 9	2	Male	19
10-19	10	Female	31
20-29	18		
30-39	15		
40-49	4		
50-59	1		
Major symptoms			
Cough	47		
Expectoration	43		
Hemoptysis	21		
Dyspnea	11		
Pain in chest	16		
Clubbing of fingers	5		
Aspiration of foreign body	1		
Duration of symptoms			
1 to 4 years	25		
5 to 9 years	15		
10 to 14 years	5		
15 to 19 years	3		
20 to 29 years	2		
Associated diseases			
Sinusitis	20		
Pneumonia	10		
Tonsillitis	6		
Pleurisy	5		
Postpneumonic empyema	3		
Deviated nasal septum	2		
Nasal polyps	2		
Mastoiditis	1		
Foreign body (peanut)	1		
Cystic disease	1		
Situs inversus	1		
Operation performed			
Right pneumonectomy	1		
Right upper lobectomy	1		
Right middle lobectomy	6		
Right lower lobectomy	6		
Right bilobectomy			
Upper and middle lobes	1		
Middle and lower lobes	4		
Left upper lobectomy	1		
Left lower lobectomy	15		
Left lower lobectomy and lingulectomy	13		
Segmental resections	2		
Treatment of hilus			
Individual ligation of hilar structures in all cases			
Anesthesia			
Cyclopropane-ether intratracheally sometimes supplemented with nitrous oxide	50		
Year of operation			
1940	4		
1941	6		
1942	8		
1943	10		
1944	10		
1945	12		
Complications			
Empyema	5		
Bronchopleural fistula	2		
Thrombophlebitis	1		
End results			
Hospital deaths	0		
Death later	0		
Living			
Follow-up			
1 to 12 months	21		
1 to 3 years	24		
3 to 5 years	5		

The duration of the symptoms in 50 per cent of the patients ranged from one to five years; in 30 per cent bronchiectasis had manifested itself from five to ten years. Two persons carried their disease for over twenty years. The chronicity of bronchiectasis is thus self evident. In 1 of the patients, aged 10, the disease was present for nine years.

A statistical critique correlating associated diseases as to etiologic factors clearly indicates the close causal relationship of infections of the accessory air passages and respiratory tract to bronchiectasis. Forty per cent of the patients had sinusitis of variable degree. Twenty per cent had a sinus operation before pulmonary resection. Pneumonia antedated bronchiectasis in 20 per cent of the cases studied. Other diseases encountered were: tonsillitis in 6, pleurisy in 5, postpneumonic empyema in 3, a deviated nasal septum in 2, nasal polyps in 2 and mastoiditis in 1 patient. Thus of the 50 patients studied almost all had some previous disease of the accessory nasal sinuses or the respiratory system.

All 50 patients were treated by pulmonary resection. The disease was more frequent in the lower lobes and lingula than in the upper lobes. In 19 cases the disease was predominantly right sided, in 31 predominantly left sided, and in 5 there was bilateral involvement. One right pneumonectomy was done. One right upper lobectomy, 6 right middle lobectomies, and 6 right lower lobectomies were performed. Right bilobectomies were done in 5 cases. There was 1 left upper lobectomy. The lower lobe of the left lung was resected in 15 cases. The lower lobe and lingula were removed in 13 cases. Two segmental resections of the basal division of the lower lobe of the left lung were performed. From the distribution of these surgical procedures it is evident that the dependent lobes were most often involved. The lingula was also affected in 43.3 per cent of the cases in which surgical treatment was carried out for bronchiectasis in the lower lobe of the left lung.[4]

All the patients received intratracheal anesthesia with cyclopropane-ether. At times these gases were supplemented with nitrous oxide. The treatment of the hilar structures was by individual ligation. Meticulous care was devoted to closure of the bronchus. It is felt that this technic diminishes the possibility of bronchopleural fistula and other complications.

Postoperative complications occurred in 8 patients. There were 5 instances of empyema which necessitated drainage; in 2 cases there was a peristent bronchopleural fistula. These have been successfully closed.[8] Another patient had thrombophlebitis which responded to anticoagulation therapy and paravertebral injection of procaine hydrochloride.

In these 50 consecutive operative cases there was no hospital death and no death has occurred during the follow-up period. Five cases have been followed from three to five years, and there was complete alleviation of complaints. Twenty-four cases have been followed from one to three years. Two patients in this group still have symptoms from bronchiectasis in the opposite lung. Twenty-one cases have been followed from one to twelve months. All members of this group are well except 2 who have contralateral disease as yet untreated. It is interesting to note that most of these patients have secured a renewed competence to enjoy life and to assume its responsibilities. In no surgical group of patients can more grateful persons be found than among those who have been cured of bronchiectasis.

PROGNOSIS

The present status of the surgical treatment of bronchiectasis clearly indicates that prognosis following pulmonary resection is favorable. Our current experience with 50 consecutive operative cases accentuates

8. Adams, R.: Bronchopleural Fistula: Description of a Technic for Closure of Fistula Persisting After Lobectomy, Lahey Clin. Bull. 4: 78-85 (Jan.) 1945.

the excellent prognosis, as almost all patients are cured or significantly improved.

Patients are termed cured when certain criteria have been fulfilled: Cough and sputum must be absent; no hemoptysis must occur, and there must be no residual pulmonary or pleural infection. The final test is the patient's ability to resume normal activity. Forty-two of this group of 50 patients have fulfilled these postulates.

SUMMARY

A presentation is made of 50 consecutive cases of bronchiectasis in which surgical treatment was carried out at the Lahey Clinic during the five year period from Sept. 1, 1940 to Aug. 31, 1945. The physical and psychologic manifestations of this disease are described. The survey has indicated that bronchiectasis is essentially a disease of young adults. In the majority of the patients symptoms developed before the fifth decade of life. In this series, 31 women and 19 men were victims of the disease.

The major symptoms, in order of frequency, were cough, expectoration productive of fetid sputum and hemoptysis.

The chronicity of the disease extended over many years. Twenty-five patients had the disease from one to five years; 15 more carried the disease from five to ten years, and the remaining 10 patients had bronchiectasis from ten to twenty years.

The high frequency of preexisting sinusitis and pneumonia in the series of cases emphasizes the causal relationship between disease of the accessory air passages, infections of the respiratory tract and bronchiectasis.

Our surgical experience has confirmed the frequency with which the lingula and lower lobes are involved.

All these patients were anesthetized with cyclopropane and ether administered intratracheally. On occasion, nitrous oxide was employed as supplementary anesthetic.

In 8 cases of the series there was a postoperative complication. In 5 there was empyema which was treated surgically. In 2 a bronchopulmonary fistula developed, and in another thrombophlebitis.

The end results were: no hospital deaths and no deaths recorded during the follow-up period. Forty-two patients are apparently cured.

CONCLUSIONS

This present study of bronchiectasis has permitted certain conclusions. First, bronchiectasis is a chronic disease which often produces serious physical and mental debility. Second, comparison with the beneficial surgical results should clearly indicate the inefficacy of medical treatment as a curative procedure. In spite of the fact that symptomatic relief may be obtained by other measures, real cure can be effected only by resection of the diseased pulmonary tissue. Surgery, therefore, should not be advised as a last resort after other procedures have been tried and found to be ineffectual. Third, the surgical treatment should be advised early in the course of the disease. It is only by treatment in this way that most patients with bronchiectasis may be relieved of their economic handicaps, social ostracism and psychologic problems. Cure of the disease will encourage such patients to rehabilitate themselves and assume their normal place in society with a renewed courage and confidence.

ABSTRACT OF DISCUSSION

DR. LYMAN A. BREWER III, Los Angeles: The physical effects of the disease are well known; however, the psychologic effects may completely overshadow those of a physical nature. The character of the symptoms, cough and expectoration, make the patient an unwelcome member of society. For fear of embarrassment he more and more shuns society. The psychologic symptoms become manifest in the first decade of life, usually show a decided increase during puberty, and by the second and third decades are so firmly fixed as to change completely the patient's personality. Antibiotics have only a temporary effect in the treatment of bronchiectasis. Sooner or later the patient must make up his mind whether he is going to live with his disease or have a pulmonary resection. In many of the cases of milder disease resection is not needed. However, one must not be misled by an apparent minimal involvement as seen by the bronchogram, when severe hemoptysis or repeated pneumonia has been present; the symptoms must be the deciding factor and not the apparently small involvement as shown with iodized poppy seed oil 40 per cent. In the cases of moderately advanced disease, resection is usually indicated if the symptoms warrant and if the pulmonary reserve is sufficient. In the cases of advanced disease, resection is always desirable. However, one must be sure that a reasonably normal pulmonary tissue is present so that near normal life can be carried on. The improvement in the operative results has been due mainly to the development of the individual ligation of the lobar stump. It is in the meticulous handling of the bronchial stump that the main problems are solved. Our technic of closing the bronchus differs from that of Dr. Adams. We use interrupted fine tantalum wire on swedged needles. We have used no coverage of the stump. There have been less than 2 per cent of bronchial fistulas, all of them transitory and healing spontaneously. We have operated in over 60 cases in the last few years with this technic and have had no operative deaths and have had excellent results as far as alleviation of symptoms is concerned.

HERPES ZOSTER APPEARING AFTER TRAUMA

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Philadelphia

Herpes zoster appearing after direct injury to large nerves or to the vertebrae in the region of a ganglion was observed by Mitchell and Keen during the Civil War. Herpes zoster also occurs after peripheral nerve injury, secondary to trauma of the skin or cornea which may be trivial.

Herpes zoster appearing after peripheral nerve injury has been frequently reported in the European literature although there are but few reports in the English literature. Such occurrence is of importance in view of laws governing workmen's compensation. Of added interest is consideration of the many untoward effects of trauma and possibly, also, of factors concerned in the awakening of viruses from a condition of dormancy.

REVIEW OF CASES REPORTED IN THE LITERATURE

Of the reported cases, the following were selected in order to illustrate certain features. Herpes zoster, with few exceptions, affected the nerve supplying the region injured. Injury to the surface of the skin or to the cornea was inflicted in various ways and was of variable degree.

Jadassohn's [1] patient injured the left thenar eminence with a splinter of iron, which was promptly extracted. Four days later vesicles appeared at the site of injury, and other lesions of herpes zoster developed on the

From the department of dermatology and syphilology, Wills Hospital.
1. Jadassohn, W.: Zoster nach peripherem Trauma, Schweiz. med. Wchnschr. 68:93, 1938.

left forearm and arm. The author regarded the initial appearance of the disease at the site of injury as proof of the relationship of injury to the occurrence of herpes zoster.

The patient reported by Künstler [2] was bitten by a person below the left nipple, causing laceration of the skin. Thirty-six hours later the site of injury became infiltrated and was surrounded by a well defined area of redness. Three days after the injury small papules appeared within this area of redness and also in the region of the fifth vertebra. After two days the papules became vesicles, and other vesicular lesions of herpes zoster appeared below the left axilla. The person by whom the patient was bitten recalled having had an eruption several months earlier. The description of the eruption suggested herpes zoster. Künstler stated the opinion that the virus of herpes zoster may remain potent for some time in the mouth of persons who have had the disease.[3]

Bernard [4] has reported the case of a man who was injured on the left calf by the stroke of a whip. Seven days later an eruption of herpes zoster appeared on the posterior aspect of the injured calf. In Parfitt's [5] patient, trauma by lightning was attributed as a causal factor. A man while shaving was struck by lightning; the razor was flung from his left hand, and he experienced a stabbing pain radiating up the left arm. Two weeks later, after having had pain in the distribution of the left supraorbital nerve, an eruption of herpes zoster appeared along the distribution of this nerve.

The following cases from the literature are illustrative of herpes zoster appearing in twenty-four hours or less after trauma. Such cases have caused controversy as to the role of trauma on account of the short incubation period.

In Mendel's [6] patient, the sharp edge of a heavy wooden box fell against the anterior aspect of the right side of the chest. The skin remained intact, the ribs were not fractured and there were no pulmonary symptoms. The same evening the patient had a chill; the next day the initial lesions of herpes zoster appeared at the site of injury.

Barthélemy's [7] patient was forcibly hit on the right side of the trunk by a crane. There was swelling, but the skin remained intact. The same evening the patient had pain in the right side of the chest; the next day an eruption of herpes zoster appeared at the site.

The occurrence of herpes zoster about one month after injury is exemplified in the 2 following reports:

The patient whose case was reported by Netter and Ernoul [8] was a physician. One finger of the left hand was pricked while the physician was enucleating an eye, the cornea of which was the site of herpes zoster. Twenty-six days later he experienced pain in the forearm and arm. This was followed two days later by an outbreak of herpes zoster on the left side of the chest. The patient's two children had chickenpox twenty days after the onset of their father's herpes zoster. Chalier and Etienne-Martin [9] report the case of a man who fell, injuring the right frontal region. The site of injury remained swollen and red for about fifteen days. Twenty-five days after the injury herpes zoster supraorbitalis appeared.

Herpes zoster ophthalmicus has been reported as occurring after injury to the eye or in the region of the eye. Ammann [10] reviewed 8 cases collected from the literature. The injuries in these cases were: (1) the eye was hit by the branch of a tree; (2) by a piece of wood; (3) by a fist, and (4) by the tail of a cow; [5] the eye was splashed by solution of indigo and lime, and (6) by solution of sodium hydrate and trisodium phosphate; (7) a gas explosion caused burn of face, and (8) a piece of wood injured forehead.

In the 5 cases in which the interval between the injury and the appearance of herpes zoster was given, it was three days in 2 cases, six days in 2 cases and eight days in 1 case.

Generalized herpes zoster has been observed after injury. The patient whose case was reported by Pernet [11] burned the left thumb; two weeks later pain appeared in the left upper portion of the chest, followed one week later by an eruption of herpes zoster involving the same area, the front and back of the left axilla and the upper inner posterior aspect of the left arm. In addition there were scattered discrete vesicles on the face and scalp, over the trunk and thighs and a few below the knees.

Barker [12] reported the case of a man who was struck over the left eye (the nature of this injury was not detailed). Severe pain in this region persisted; one week later an eruption of herpes zoster ophthalmicus appeared on the left side. Five days after its onset, there was an outbreak of vesicles and papulovesicles on the trunk and arms.

Herpes zoster has been observed to occur after intramuscular injections in the buttocks, lumbar puncture, deep roentgen therapy in the region of a ganglion and from pressure of pathologic processes.[13] Schönfeld [14] reviewed some of the reported cases which occurred in such circumstances. The interval between trauma and the onset of herpes zoster varied between two and ten days. In Fox's [15] patient herpes zoster appeared about five days after an osteopathic manipulation of the spine.

REPORT OF CASES

In the following cases,[16] observed by me, herpes zoster appeared after injury. The injury was of variable degree and of variable causation. The disease appeared

2. Künstler, W. E.: Beitrag zu der Frage der traumatischen Entstehung des Herpes zoster, Schweiz. med. Wchnschr. **67**: 900, 1937.

3. I have been unable to find laboratory proof of this. The virus of herpes simplex has been demonstrated in the mouth, nasal secretion and conjunctival sac of persons who have, or recently have had, herpes simplex and also of those who are predisposed to the disease.

4. Bernard, R.: Zona et traumatisme, Bruxelles-méd. **18**: 83, 1937.

5. Parfitt, D. N.: Herpes Zoster as a Sequel to Lightning Trauma, Brit. M. J. **1**: 111, 1936.

6. Mendel, K.: Herpes zoster nach Unfall, Neurol. Zentralbl. **33**: 859, 1914.

7. Barthélemy, R.: Zona traumatique, Bull. Soc. franç. de dermat. et syph. **34**: 893, 1927.

8. Netter, A., and Ernoul, J.: Zona dans le territoire du médian gauche vingt-six jours après une legère piqûre à l'extremité du médian gauche au cours d'une éviscération d'un globe oculaire atteint de fonte purulente de la cornée suite d'un zona ophtalmique, Bull. et mém. Soc. méd. d. hôp. de Paris **50**: 798, 1934.

9. Chalier, J., and Martin, P. E.: Le zona traumatique, J. de méd. de Lyon **13**: 697, 1932.

10. Ammann, E.: Herpes zoster ophthalmicus traumaticus, Klin. Monatsbl. f. Augenh. **95**: 793, 1935.

11. Pernet, G.: Generalized Herpes Zoster, Brit. J. Dermat. **26**: 399, 1914.

12. Barker, L. P.: Generalized Herpes Zoster: Report of Nine Cases, Arch. Dermat. & Syph. **40**: 974 (Dec.) 1939.

13. Carter, H. R.: Herpes Zoster Following Lumbar Puncture, Am. J. Psychiat. **94**: 373, 1937. Pogany: Herpes zoster nach Quecksilber succinimide, Zentralbl. f. Haut- u. Geschlechtskr. **17**: 626, 1925.

14. Schönfeld, W.: Die traumatischen Formen des Zoster, in Jadassohn, J.: Handbuch der Haut- und Geschlechtskrankheiten, Berlin, Julius Springer, 1928, vol. 7, pt. 1.

15. Fox, H.: Herpes Zoster Following Osteopathic Manipulation of the Spine, J. Cutan. Dis. **34**: 773, 1916.

16. The herein reported case records of patients with herpes zoster ophthalmicus were presented at a meeting of the Philadelphia Ophthalmology Society on Oct. 18, 1945.

in the region of injury after an interval varying from one to nine days. In some of the patients, symptoms of sensory disturbance intervened between injury and the outbreak of herpes zoster.

CASE 1.—A machinist arising from a stooping position bumped the left side of the forehead against a fixed object. The injury did not lacerate the skin. The injured area pained for a short time. He felt otherwise all right and continued to work. The injury occurred at 6 a. m. Headache appeared the same day and became progressively worse throughout the next forty-eight hours. It was described as a dull pain radiating from the back of the head to the forehead, confined to the left side. The third day after injury an eruption of herpes zoster appeared, involving the supraorbital branch of the fifth nerve on the left side. The upper and lower lids were swollen; the eye was closed. The cornea was not affected. The patient resumed work two weeks after the onset of herpes zoster.

CASE 2.—A woman getting out of the rear seat of an automobile struck the right side of her head on the frame of the door. The skin was not cut, and no swelling resulted. She regarded the bump as inconsequential, causing no inconvenience. The injury occurred at 5 p. m. The next morning pain appeared, which was confined to the right side of the head and neck and became more severe in the ensuing twenty-four hours. On the third day after the injury an eruption of herpes zoster appeared, confined to the right side of the scalp and forehead. The cornea was not affected. The eruption disappeared about two weeks after onset, but the pain in the head and neck persisted about three months.

CASE 3.—A mechanical engineer during working hours carried in his right upper vest pocket a micrometer, a steel rule and a gage plug. He fell against a table, and the impact pressed these tools against the right breast. At the time he experienced pain which was not severe and soon disappeared. The skin was not broken. The injured region did not show any evidence of being bruised. About two days later the right breast, especially the nipple, was tender to touch, and a dull ache appeared in the right side of the chest, which prevented sleeping on the right side. One week after the injury herpes zoster appeared, involving the right side of chest at the level of the right breast, extending onto the back. The first eruption of vesicles appeared on the right breast. On account of pain he was incapacitated for one month.

CASE 4.—A man was bitten by a horse on the outer aspect of the lower third of the right forearm. The resulting laceration was superficial and healed in a few days. Nine days after the injury an eruption of herpes zoster appeared on the right arm and forearm. There was pain in the region of the shoulder, radiating down the arms. Sleep was disturbed. The site of injury on the forearm was represented by congestion.

CASE 5.—A painter working on a ladder slipped, striking the left side of his chest against a hard object in the region of the tenth and eleventh ribs. He had some pain, although it was not severe; he continued to work. He did not inspect the site of the injury until the next day, at which time there was no evidence of injury. In two days an eruption of herpes zoster appeared on the left side in the region of the injury.

CASE 6.—A janitor, while sweeping, experienced a sensation of a foreign body in the right eye. The eye became red; the sensation of a foreign body persisted. Two days later an ophthalmologist removed a foreign body from the cornea. The day following its removal an eruption of herpes zoster, accompanied by pain, appeared on the right side of the scalp and forehead, extending to the base of the nose. There was an involvement of the cornea. Three weeks were lost from work. Pain disappeared in about two months.

CASE 7.—A mechanic repairing refrigeration apparatus in a dairy forcibly turned a rusty valve; a leak resulted. A jet of sulfur dioxide squirted out. (Sulfur dioxide is a gas which is toxic when inhaled; cold reduces it to a liquid. It is an irritant to the skin, mucous membranes and eyes.) At the time of the accident he jerked back, his mask was dislodged and the jet of liquid struck his forehead and eyes. He experienced a burning sensation of both eyes with tearing. He said the left eye was more affected than the right.

The accident occurred in the early afternoon. When he arrived home about 4 p. m. the eyes were still burning, and the left side of the head became numb. That evening his wife noticed redness of the left side of the forehead. The next morning the burning sensation of the right eye disappeared but the left eye was swollen and the adjacent skin was red. An outbreak of blisters appeared on the scalp and the left side of the forehead. He then saw an ophthalmologist, whose diagnosis was herpes zoster with corneal involvement.

CASE 8.—A boy aged 12 had a wart on the right side of the forehead removed by electrodesiccation. The operative area healed uneventfully. Two weeks after removal of the wart, herpes zoster appeared on the right side of the scalp and forehead. The cornea was not affected.

ETIOLOGIC MECHANISM

It is not reasonable to ascribe herpes zoster appearing after the aforementioned circumstances to a chance occurrence. What is the mechanism of the association with trauma and what should be the interval between trauma and the occurrence of herpes zoster in order to reasonably ascribe to trauma a causal role? Does the virus [17] of herpes zoster exist in the body at the time of injury, the latter producing a locus minoris resistentiae; is the virus introduced at the time of injury, resulting in an ascending infection of the nerve, or is the nerve involved through a transfer by the blood stream of the virus, since it is neurotropic?

It is well known that herpes simplex may follow exposure to the sun or appear during fever. Herpes zoster may occur as an untoward reaction to arsenic. These occurrences evidence the influence of endogenous and exogenous factors in awakening viruses from a condition of dormancy.

Neurologic complications varying from palsy of a single peripheral nerve to fatal meningoencephalitis following the administration of serums and vaccines, indeed, following almost all of the therapeutic procedures, have been recorded.[18]

In Keim and Wakefield's [18b] review of these complications, symptoms usually appeared within fourteen days. Some authors attribute the awakening of inapparent or latent viruses from a condition of dormancy as a cause of these complications. Keim and Wakefield regard such awakening as an explanation of Milian's theory of biotropism.

It is generally believed that the virus of poliomyelitis attaches itself to the endings of the olfactory nerve and enters the spinal cord by this route.

17. Experiments made to ascertain if zoster is caused by a virus have given conflicting results. The opinion is stated by some that it has not been conclusively shown that zoster is caused by a virus and that the disease may represent a syndrome resulting from any process causing inflammation of the spinal ganglion. Others accept experimental evidence as valid proof of virus causation and regard the elementary bodies demonstrable in herpes zoster vesicles, particularly in the first forty-eight hours, as representing the specific virus of the disease. Proof that a virus causes herpes zoster is not as readily demonstrated as is such proof in the cause of herpes simplex.

18. (*a*) Young, F.: Peripheral Nerve Paralysis Following Uses of Various Serums: Report of Case and Review of Literature, J. A. M. A. **98**: 1139 (April 2) 1932. (*b*) Keim, H. L., and Wakefield, R. F.: Flaccid Paraplegia Following the Diagnostic Use of Frei Antigen, Arch. Dermat. & Syph. **40**: 709 (Nov.) 1939.

Chalier and Etienne-Martin [9] formulated two circumstances in order to associate trauma with the occurrence of herpes zoster. 1. Herpes zoster should appear in the region or within the range of the injury, even though slight and not productive of a wound. 2. The disease should appear within one day to one month after the injury.

The incubation period of spontaneously occurring herpes zoster is not known. In discussing this period, the following considerations are pertinent:

It is perhaps generally accepted that the occurrence of chickenpox in children after exposure to a patient with herpes zoster, and vice versa, is not a chance occurrence.[19]

Of the reported cases of herpes zoster appearing after exposure to chickenpox and occurring in circumstances in which the time of exposure could definitely be established, the incubation period was about twelve days.

In experiments to ascertain whether herpes zoster is transmissible to animals, some investigators (Lipschütz,[20] Lamothe and Bernadou,[21] Pette,[22] Kuga and Masuda [23]) produced keratitis in rabbits forty-eight hours after inoculation with demonstration of inclusions within the nuclei of the epithelial cells of the cornea. Kuga and Masuda [23] observed such inclusions twenty-four hours after corneal inoculation.

Teague and Goodpasture [24] produced herpes zoster by inoculating the tarred skin of guinea pigs and rabbits. Vesicles appeared at the site of inoculation in three to four days in guinea pigs and not later than six to seven days in rabbits.

COMMENT

It is to be recalled that there are revolutionary implications in recent work on viruses. From considerations herein discussed, it is reasonable to believe that trauma may precipitate herpes zoster. The minimum degree of trauma and the interval between trauma and the appearance of herpes zoster in order to ascribe to trauma a causal role cannot precisely be defined. There is no experimental criterion of what this interval should be. From experimental evidence and clinical observations, the incubation period of herpes zoster ranges from a few days to about two weeks. From the cases herein reported and from the review of the literature, an interval of about one day to about three weeks from the time of injury to the appearance of herpes zoster predominated. It is difficult to exclude one or a few days, since in some cases there was a connecting link of subjective symptoms of nerve involvement in the interval between injury and an eruption of herpes zoster. From this pragmatic evidence the longer the interval beyond three weeks, the greater is the probability of a noncausal role of trauma.

PROGNOSIS OF HERPES ZOSTER TRAUMATICUS

The prognosis in herpes zoster traumaticus is that of spontaneously occurring herpes zoster. The disease in the majority of patients pursues an uneventful course to recovery; pain is not sufficiently severe to incapacitate. Of patients above middle age, however, pain may be severe and protracted, causing incapacitation.

The prognosis of ophthalmic zoster is more guarded on account of ocular complications which may cause impaired visual acuity, or, indeed, blindness. Geniculate zoster (Ramsey-Hunt syndrome) and glossopharyngeal-vagal zoster may have sequelae referable to the nerves affected.[25]

Associated with herpes zoster, a variety of paralytic accidents—Landry's paralysis, sympathetic paralysis of the deltoid and of the hand, of the third and seventh nerves—have been reported.[26] Other complications include a generalized eruption resembling chickenpox, myelitis or encephalitis, symptoms of spinal nerve degeneration.

SUMMARY AND CONCLUSIONS

In 8 cases, herpes zoster appeared in the region of injury to the skin or to the cornea, inflicted in various ways and to a variable degree, after the following intervals in days—fourteen, nine, seven, three (3 cases) and about one. In some of the patients, symptoms of sensory disturbance or pain intervened between injury and the outbreak of herpes zoster.

Review of the literature disclosed many reports of herpes zoster appearing in from one day to thirty days after injury, at times trivial, to the skin or cornea. Herpes zoster has also been reported as appearing after lumbar puncture, intramuscular injection of a medicament, osteopathic manipulation of the spine and deep roentgen therapy in the region of a ganglion.

It is therefore reasonable to believe that trauma may precipitate herpes zoster. The minimum degree of trauma and the interval between trauma and the appearance of herpes zoster in order to ascribe to trauma a causal role cannot precisely be defined. From experimental evidence and clinical observation of spontaneously occurring zoster, the incubation period of the disease ranges from a few days to about two weeks. From the cases reported in this study and from review of the literature, an interval of from one day to three weeks predominated.

1934 Spruce Street.

19. This suggests a relationship of the two viruses. Whether they are distinct species or a variety of the same species is unknown. Amies (The Elementary Bodies of Herpes Zoster and Their Serologic Relationship to Those of Varicella, Brit. J. Exper. Path. **15**: 314, 1934) conducted agglutination tests with suspension of elementary bodies obtained from early vesicles of herpes zoster. Such suspension was agglutinated by the serum of several patients convalescing from herpes zoster in a dilution of 1: 128. Serum from patients with chickenpox was agglutinated in a dilution of 1: 16. Serum from 15 normal persons gave negative results.

20. Lipschütz, B.: Untersuchungen über die Ätiologie der Krankheiten der Herpesgruppe: Herpes zoster, Herpes genitalis, Herpes febrilis, Arch. f. Dermat. u. Syph. **136**: 428, 1921.

21. Lamothe, P., and Bernadou, H.: Zona infectieux et zona traumatique, Progrès méd. **1**: 905, 1932.

22. Pette, H.: Tierexperimentelle Studien zur Frage der "Viruswanderung" im Nervensystem, Deutsche Ztschr. f. Nervenh. **121**: 113, 1931.

23. Taniguchi, T.; Hosokawa, M.; Kuga, S., and Masuda, Z.: The Virus of Herpes and Zoster, Jap. J. Exper. Med. **12**: 101, 1934.

24. Teague, O., and Goodpasture, E. W.: Experimental Herpes Zoster, J. M. Research **44**: 185, 1923.

25. Reference to these forms of zoster appearing after trauma could not be found.

26. Schuback, A.: Herpes zoster und Landrysche Paralyse, Ztschr. f. d. ges. Neurol. u. Psychiat. **123**: 424, 1930. Worster-Drought, C., and McMenemly, W. H.: Paresis of the Upper Motor Neurone Type Following Herpes Zoster, J. Neurol. & Psychopath. **14**: 52, 1933. Potts, C. S.: Paralysis of the Oculopupillary Sympathetic Fibers and the Ophthalmic Division of the Trigeminal Nerve, Preceded by Ophthalmic Herpes Zoster, Arch. Neurol. & Psychiat. **16**: 71 (July) 1926. Case I reported by Grindon, J., Jr.: Herpes Zoster with Generalized Eruption: Report of Three Cases, Arch. Dermat. & Syph. **39**: 867 (May) 1939.

Diabetes Insipidus.—The primary dysfunction in diabetes insipidus is a deficiency in the supply of the antidiuretic hormone of the posterior pituitary gland, resulting in deficient reabsorption of water by the distal renal tubules and thereby producing polyuria and polydipsia.—Beaser, Samuel B.: Renal Excretory Function and Diet in Diabetes Insipidus, *Am. J. M. Sc.*, April 1947.

THE PLACE OF HEALTH RESORT THERAPY IN DERMATOLOGIC DISORDERS

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Most American dermatologists, and I include myself, have had little personal experience with health resorts and their effect on diseases of the skin; there is a paucity of articles in American literature dealing with this subject. One may obtain many brochures and handbooks on health resorts distributed by chambers of commerce of foreign cities, but this type of literature is of little scientific value. Some of the more important works on the subject are listed in the bibliography.[1]

In order to evaluate the benefits which a patient with a cutaneous disorder might expect to derive from a sojourn at a health resort, I studied all the literature I could find and abstracted what I considered of value.[2] The amount was meager. There were lists of cutaneous diseases that were said to be benefited by treatment at spas, but the nature of these diseases and the reasons for referring those who had them to health resorts were not discussed.

I then wrote to a number of outstanding American dermatologists, asking their experiences and opinions regarding the place of health resorts in the treatment of dermatologic disorders. These included Drs. John Downing, Martin Engman Sr., Howard Fox, George M. Mackee, Louis Mount, Paul O'Leary, Oliver Ormsby, Richard L. Sutton Jr., Udo Wile and Fred Wise. All replied promptly and cooperated splendidly, for which I thank them.

It should be understood from the outset that ordinary cutaneous diseases are usually well managed at home by the experienced dermatologist. The cases that require further resources, and which can profitably be referred for resort therapy, are those that are chronic, recurrent, recalcitrant and generalized. Dermatoses of this type are extremely difficult to manage even in the best hospitals equipped with all necessary diagnostic and therapeutic aids. It is therefore essential that a health resort which undertakes the treatment of these resistant diseases of the skin should have a well trained and capable dermatologist in residence with a full armamentarium at his command, including an x-ray machine for therapy, ultraviolet apparatus, an electrosurgical unit and facilities for biopsies, bacteriologic and mycologic studies. Equipment for minor surgery and allergy studies (patch and scratch testing) is desirable. The details of the physical plants, the chemical constituents of the waters [3] and the surrounding terrain of American spas have been fully discussed elsewhere.

In general it may be said that the cases in which the patient will benefit most from a sojourn at a health resort are those in which change of locale, removal from physical or psychic irritants and the establishment of a scientifically regulated regimen, supplemented by treatment with therapeutic waters, can be expected to improve primarily the patient's general health and sense of well-being and secondarily his dermatosis.[4]

I shall therefore describe briefly a group of cutaneous diseases that should respond better to treatment under ideal resort conditions than to ordinary office treatment. These diseases are arranged in alphabetical order.

ACNE VULGARIS

A small percentage of cases of acne vulgaris fail to respond even to the best dermatologic treatment. An extensive variety of acne vulgaris which affects most of the back, neck and sometimes the chest is called acne cachecticorum (conglobata). It is characterized by deep pustular lesions with subcutaneous communications and the formation of cysts. The general health is usually poor, and the patients are often discouraged and depressed because of the disfigurement. Those with acne conglobata may do better at a health resort under a regulated regimen including graduated exercise, daily exposure to ultraviolet rays, midday rest in bed, properly controlled diet and internal medicaments. The quiet atmosphere, the medicated baths and an understanding personnel do much for the depressed and morose patient. Local surgical intervention, appropriate topical applications and even roentgen irradiation may be administered as indicated.

DERMATITIS EXFOLIATIVA

Exfoliative dermatitis is a serious, disabling, chronic and universal eruption. Patients with this disease are in constant discomfort from the intense pruritus, burning and fissuring. Because of the damage to the temperature-regulating function of the skin, they suffer from chills and shiver unless protected by warm clothing. Exfoliative dermatitis may be caused by the application of strong remedies for the treatment of psoriasis and other diseases or by the intake of drugs, especially arsenic; or it may be a forerunner of mycosis fungoides or leukemia cutis. Most cases, however, are of unknown cause. These idiopathic cases are generally treated by rest in bed, medicated baths, the application of soothing emollients and roentgen therapy.

It has been the practice of some dermatologists to advise patients with exfoliative dermatitis to move to a locality such as Arizona, Texas, Florida or southern California, as climatic and environmental changes have proved beneficial in a limited number of cases. Such patients might improve more satisfactorily in a place where continuous or at least frequent medicated baths could be employed.[5] Prolonged warm baths are soothing and conducive to sound sleep. Sulfur, carbon dioxide, potassium permanganate, starch, bran or tar baths give patients the greatest symptomatic relief. After the bath, the application of an emollient eases the discomfort caused by the fissures. Forced elimination with alkaline waters has a favorable effect both on the disease and on the general health of the patient. Natural or artificial heliotherapy and infra-red irradiation are useful adjuvants. Diets adjusted to individual needs, vitamins, quinine, autohemotherapy, intravenous sodium thiosulfate or calcium gluconate and roentgen

1. British Health Resorts: Spa Seaside Island, Official Handbook of the British Health Resorts Association, London, J. & A. Churchill, Ltd., 1937. Spas and Mineral Waters, Queries and Minor Notes, J. A. M. A. **113**: 1509 (Oct. 14) 1939. Bureau of Clinical Information: Saratoga Springs, New York M. Week **10**: 12 (Dec. 12) 1931.

2. Vogt, H.; Teil, E., and Teil, Z.: Lehrbuch der Bäder- und Klimabeilkunde, Berlin, Julius Springer, 1940. Jadassohn, J.: Medikamentöse Bäder, in Handbuch der Haut- und Geschlechtskrankheiten, Berlin, Julius Springer, 1930, vol. 5, pt. 1, p. 644. Fantus, B.: Our Insufficiently Appreciated American Spas and Health Resorts, J. A. M. A. **110**: 40-42 (Jan. 1) 1938.

3. Fitch, W. E.: Mineral Waters of the United States and American Spas, Philadelphia, Lea & Febiger, 1927.

4. Kovacs, R.: American Spas, Hygeia **17**: 207 (March) 1939. McClellan, W. S.: The Saratoga Spa: Its Place in the Treatment of Rheumatic Disorders, Arch. Phys. Therap. **18**: 408 (Aug.) 1937. Stearns, N.; Stearns, H. T., and Waring, G. A.: Thermal Springs in the United States, United States Department of the Interior, 1937. Wallace, A. W.: The Modern Health Resort: Appraisal of Its Possibilities, J. A. M. A. **107**: 419-421 (Aug. 8) 1936.

5. McClellan, W. S.: The Place of Carbon Dioxide Baths in the Treatment of Diseases of the Circulation, Internat. Clin. **1**: 199 (March) 1937.

therapy may be administered as indicated by the resident dermatologist. As improvement progresses the initiation of graduated exercises, occupational therapy and diversional activities will be found beneficial.

DERMATITIS MEDICAMENTOSA

Many eruptions result from the habitual ingestion of drugs, especially those taken for constipation, nervousness and insomnia. The drugs most commonly involved in dermatitis medicamentosa are phenolphthalein, phenobarbital and the bromides. Phenolphthalein produces erythematous plaques involving multiple areas. These gradually become purplish and persist as violaceous or dark brown round or oval patches. An acute erythematous reaction occurs each time the drug is ingested. Phenobarbital may produce a rash resembling that of measles or scarlet fever; in rare instances it has caused exfoliative dermatitis. The bromides produce many types of lesions, the commonest being acneform and erythema-nodosum-like lesions which may ulcerate. Many other drugs cause eruptions, especially penicillin and the sulfonamide compounds. It is believed that any drug, with the exception of the salines, is capable of producing a dermatitis in a sensitive person.

In most instances the diagnosis is promptly made, the drug is withdrawn and the lesions subside. Patients can in most instances be relieved of the condition for which they take these drugs by treatment at a spa or health resort. The alkaline waters can do much to restore normal bowel function; and baths in the hydrotherapy pavilion, coupled with message, mild active exercise, regulation of sleeping hours and diet and the elimination of stimulating foods and excitement can do much to overcome nervousness and insomnia.

ECZEMA

Two varieties of eczema which are especially amenable to spa treatment are generalized neurodermatitis and the generalized or recalcitrant localized types of eczema seborrheicum. Other diseases of the group to be considered are dermatitis venenata, generalized nummular eczema and chronic exudative discoid and lichenoid dermatitis.

The cause of neurodermatitis is not clear. There is a familial tendency and a history of allergic manifestations in members of the family or in the patient. Endocrine and emotional factors also play a part. The disease may begin in infancy and may last with periods of remission and exacerbation through middle life. The lesions are often localized to the flexures of the elbows and knees, the sides of the neck and the ears and hands, but they may be generalized. The skin is erythematous, lichenified and sometimes fissured and exudative. The pruritus is so intolerable that the patient often spends sleepless nights. Sedatives and hospitalization are required for amelioration of symptoms.

Many patients with neurodermatitis have improved by going to the seashore in summer, where salt water bathing, sunshine, rest, good food and moderate exercise were the only therapeutic agents employed. Others have benefited by the complete change of environment obtained in Arizona, Texas, southern California or Florida. I believe that sufferers from neurodermatitis would be helped by treatment at an appropriate health resort, especially if the services of a dermatologist were available. Improvement should be noted in the general health, the psychologic and emotional status and in the cutaneous condition of the patient. Treatment at a resort has the added advantage of removing the patient from such possible environmental irritants as pollens, epidermals and dust.

Generalized and recalcitrant localized cases of neurodermatitis are particularly suitable for treatment at a health resort at which it is possible for the patient to obtain roentgen therapy, generalized ultraviolet irradiation, hemotherapy and the proper topical applications, combined with a general regimen conducive to good physical and mental health. For generalized pruriginous and exudative eruptions, nothing is more beneficial than mildly antiseptic baths. Continuous medicated baths with mechanical regulation of the temperature and the concentration of the solution are especially desirable and are available at some health resorts. Regular and graduated exercise, occupational therapy, attention to bowel function, ingestion of large quantities of alkaline waters, menus adjusted to each particular patient, midday rest and diversional activities afford much help to the sufferer who has had no relief night or day from the torment of long-continued extensive pruritic eruptions.

Eczema seborrheicum is thought to be caused by the Pityrosporum ovale in sensitized subjects, but in most instances the cause is not known. The disease occurs as greasy, scaly patches of dermatitis affecting principally the scalp, face, interscapular region and sternum. The hairy parts all over the body, including the eyelashes, eyebrows and the hairs in the nose may be affected. Exceptionally, patients with this disorder may show lesions all over the body and the eruption may be exudative. These generalized infections are particularly recalcitrant and some temporary relief is obtained only when hospitalized. Some patients with recurrent generalized seborrheic dermatitis need a change of environment and climate. Continuous medicated baths, especially with sulfur or tar, are beneficial, and proper rest, diet and exercise are better regulated at a well organized health resort than at home. Natural heliotherapy combined with mental rest and relaxation often improve the patient's condition in stubborn cases of extensive seborrheic dermatitis.

Other eczematous eruptions such as dermatitis venenata and generalized nummular eczema are amenable to treatment at health resorts. Most cases of contact dermatitis are easily detected and easily cured, but there are some in which the most careful search for the cause of the infection is fruitless. When patients with intractable contact dermatitis are transferred to the controlled environment of a spa the lesions are apt to disappear, and hence the chances for discovering the cause of the disease are increased. Continued nervous tension or an emotional upset may precipitate an attack of nummular eczema, so that treatment at a health resort directed both to the nervous system and the skin is beneficial also from this point of view.

Many of the patients who occupy beds in dermatologic wards are suffering from chronic exudative discoid and lichenoid dermatitis. There is a strong psychoneurotic element in every patient with this form of recurrent chronic dermatitis, which principally affects men who are emotionally unstable and whose financial status is uncertain. These patients suffer a great deal and are unable to work. The lesions, which cover practically the entire body, consist of small, discrete papules, some of them grouped. In places the eruption is papulovesicular. There are intense pruritus, excoriations and exudation. Under hospital care

the condition improves, but it recurs promptly under the stress and strain of ordinary activity. A change of environment, a carefully selected regimen of rest and diet, exercise in the open air, and the stimulating and tonic effects of hydrotherapy, heliotherapy and directed diversions are beneficial to patients with chronic exudative discoid and lichenoid dermatitis. Such treatment is of special value in improving the psychologic outlook of the patient and in fact is probably the only kind that may have lasting effects.

FURUNCULOSIS

The ordinary furuncle can be managed adequately by any physician. However, there are some cases in which lesions are scattered all over the body; as soon as one resolves another develops, and this goes on for many months with occasional remissions. Chronic recurrent multiple furunculosis should respond well to a controlled environment and a well regulated regimen. Prolonged and frequent medicated baths containing sulfur are beneficial and easily obtained at a spa. Autohemotherapy, vaccine, bacteriophage, penicillin and other antibiotics, roentgen rays, ultraviolet rays, vitamins and natural alkaline waters can all be administered expediently at a health resort. A careful medical check-up to rule out diabetes, anemia, foci of infection and other provocative causes is essential to the proper management of all cases of chronic recurrent multiple furunculosis.

HERPES ZOSTER

Neuralgia may persist for months after the cutaneous lesions of herpes zoster have resolved. This painful disease limits normal function, and treatment at a health resort should do much to shorten its duration. Ingestion of the natural waters, carbonic acid or sulfur baths, occupational and infrared therapy, rest, exercise, proper diet and a well regulated life should hasten recovery. Treatment with roentgen rays, sodium iodide, thiamine hydrochloride or posterior pituitary injection may be carried out if indicated in any resort properly equipped to treat all types of cutaneous disease.

LICHEN PLANUS

Lichen planus is a disease characterized by the development of papules affecting the flexor surfaces of the forearms, arms, legs and, occasionally, the glans penis and mucous membranes of the mouth. The disease is usually localized but may be generalized. The papules are pinhead to pea sized, flat topped, umbilicated and polygonal. They are violaceous, and the pruritus is at times intense. The cause is not definitely known, but the disease usually occurs in patients of a nervous temperament. Overwork, nervous shock, worry, anxiety and fatigue are significant factors. It is usually acute, runs its course of about six weeks and terminates forever. A few cases are chronic and recurrent.

Most of the chronic recurrent lesions are controlled by treatment with roentgen rays and injections of a bismuth preparation. Some patients do better when the environment is changed. Treatment at a health resort should be beneficial, especially for highly tense patients. Most of the cases would probably clear up spontaneously under regular spa regimen without the necessity of special dermatologic therapy.

NEUROSES OF THE SKIN

Hyperesthesia, dermatalgia, meralgia paresthetica and erythromelalgia are caused by some disorder of the nervous system. In most instances hysteria, neuroses and functional disturbances of the central nervous system are responsible. Occasionally these peculiar cutaneous reactions are due to central organic disease. If the cause is functional, improvement should follow treatment at a spa or health resort. Hydrotherapy, sulfur or carbon dioxide baths, generalized ultraviolet irradiation, occupational therapy, diversional activities, supervised and graduated exercise, regulated sleep, elimination of all stimulants and an individualized diet fortified with vitamin B tend to improve the general health and should clear up these cutaneous neuroses.

PRURITUS

Pruritus is a symptom. Most itchy dermatoses, and especially the parasitic diseases, do not need the special treatment afforded by health resorts. Patients suffering from idiopathic types of pruritus, such as senile and essential pruritus and even those with some types of pruritus caused by disturbances of the liver and gallbladder may be greatly relieved by such treatment. Elderly persons who suffer from senile pruritus, due no doubt to atrophic changes in the skin, are restless and irritable most of the time, and much sleep is lost because of the constant itching. The regulated life at a health resort with proper emphasis on graduated exercise, medicated baths, steaming, massage and attention to bowels and diet should do much to relieve the pruritus and induce normal sleep. In all cases of essential generalized pruritus every effort should be made to find the cause, and a careful general medical check-up of the patient is the first step to be taken.

PSORIASIS

Psoriasis is a chronic inflammatory disease which tends to recur. Remissions following treatment may occasionally last for years. The disease usually occurs in otherwise normal persons and is characterized by variously sized, rounded, marginated, erythematous patches with thick, micaceous scales, situated principally on the elbows and knees, scalp and nails. Most patients, however, have lesions all over the body, and in a few instances the eruption is universal, simulating exfoliative dermatitis. The cause is unknown, although it is sometimes associated with arthritis. The disease is influenced by diet, rest, climate and other environmental factors.

There is no specific treatment for psoriasis. Severe cases may clear up under the influence of ultraviolet rays in a mild climate such as that of Florida, southern California and the near tropic regions. It also seems to resolve in temperate zones when patients avail themselves of natural sunshine at the seashore or at high altitudes. It has been the observation of many dermatologists that when psoriasis clears up under natural influences, such as sunshine and climate, the remissions are apt to be prolonged. A health resort, especially one situated in a favorable climate, has much to offer the patient with psoriasis. The natural sulfur and carbon dioxide baths are especially efficacious in removing thick scales so that topical applications can more easily reach the inflammatory process. Hydrotherapy and massage are other useful adjuvants in the treatment of psoriasis. Alkaline waters increase kidney

and bowel elimination, with beneficial effect on the general health. Diet can be carefully regulated. A low fat diet is most favored today. In the past protein-free diets were recommended, and there are still a few dermatologists who adhere to this practice. A health resort with a dermatologist in residence can carry out other methods of treatment if indicated, such as roentgen irradiation, administration of vitamins and arsenic preparations, hemotherapy and the Goeckerman treatment. There is no question in my mind that recalcitrant generalized cases of psoriasis can best be treated at a health resort situated in a favorable climate and equipped to treat dermatologic diseases.

TUBERCULOSIS

The manifestations of cutaneous tuberculosis are many and differ greatly. Forms of tuberculosis which are suitable for treatment at a health resort or spa are lupus vulgaris, tuberculosis verrucosa cutis, scrofuloderma, erythema induratum of Bazin, and papulonecrotic tuberculid. Active pulmonary tuberculosis is uncommon in persons with tuberculoderma. Erythema nodosum will be included in this group because some instances of this disease are caused by Mycobacterium tuberculosis, although other bacteria, especially the streptococci, are responsible.

In addition to local measures, all forms of cutaneous tuberculosis require systemic treatment aimed at improving the general health of the patient. Regular sleeping hours including midday rest, a diet rich in vitamins and high in proteins and calories, good hygiene, regulated exercise and the administration of liver extract are helpful in increasing resistance to Myco. tuberculosis. Intense daily local irradiation and mild generalized irradiation with natural or artificial ultraviolet rays are extremely beneficial. Treatment with tuberculin, gold salts, roentgen rays, carbon dioxide refrigeration and other methods can be carried out at the discretion of the resident dermatologist. Tuberculodermas run a chronic course, and treatment at a properly equipped spa or health resort should hasten resolution.

ULCERS

Specific ulcers caused by tuberculosis, syphilis, cancer, microaerophilic hemolytic streptococci, certain fungi, malingering and other causes will be excluded from consideration. I shall confine my remarks to chronic ulcers of the leg and ulcers from third degree burns that are extremely slow in healing. These lesions are substantially helped by hydrotherapy, massage, regulated exercise, proper rest and diet and other measures that would improve the general health and the peripheral circulation of the patient, such as carbon dioxide baths, heliotherapy, vitamins and alkaline waters for improved elimination. Such treatment as elevation of the affected parts, support of the circulation with gelatin or elastic bandages, acetyl-beta-methylcholine (Mecholyl) bromide iontophoresis and proper topical applications should be carried out along with general resort treatment.

URTICARIA

The acute type of urticaria that follows the ingestion of some food to which the patient is sensitized lasts only a few days and is entirely cured with a cathartic and the injection of a few minims of epinephrine.

Chronic urticaria is one of the most difficult diseases to treat, because its cause is obscure. In some instances, chronic urticaria is caused by food, in others by an infectious focus. Most cases of idiopathic chronic urticaria occur in highly emotional subjects, and excitement, worry, a catastrophe, fatigue and similar factors will precipitate an attack.

Since there is no specific treatment for chronic urticaria, change of environment and regular treatment at a spa should be of service. Its facilities for exercise, hydrotherapy, rest, diet, elimination of stimulating foods and drinks and the use of diversional activities and occupational therapy should be employed. The response to such treatment is often immediate, and the improvement in general health and the resultant mental relaxation should give the patient a long and perhaps permanent respite from symptoms.

VASCULAR DISEASES

Certain vascular diseases such as Raynaud's disease, pernio (chilblains), sclerodactylia and scleroderma are benefited by climatic conditions. Patients with these disorders do not tolerate cold weather well. At a health resort located in a warm climate and possessing adequate facilities for medical treatment, patients with vascular diseases can be made more comfortable and their life prolonged.

COMMENT

It is worth while to emphasize the fact that a hotel[6] at the seashore or at the mountains, equipped with hydrotherapy apparatus and a solarium, is not a health resort and is useless for the treatment of cutaneous diseases. The comprehensive, supervised regimen, supplemented by specialized treatments as described, can be undertaken only at an establishment designed and equipped solely for therapeutic purposes.

It is important to mention radium waters. Roentgen rays and radium rays—applied externally—are valuable in the treatment of many diseases of the skin and in fact constitute the most important modalities in the armamentarium of the dermatologist. But because they are highly potent agents they must be administered with great caution in accurate dosage and under expert supervision. The efficacy of radium waters has never been proved. Bathing in waters which contain therapeutically effective quantities of radioactive substances is dangerous, in my opinion, and drinking them is even more to be condemned. Radioactive substances absorbed through the skin or taken internally, even in minute doses, have a cumulative effect which can cause degenerative changes and even death. The use of radium waters should be discouraged for the treatment of cutaneous diseases.

The chemistry, physiology and metabolism of the skin have not been discussed in this paper, since material on these subjects is available in standard books on dermatology and in a book by Markovitz.[7]

SUMMARY

1. Patients suffering from diseases of the skin are as a rule ambulatory and can avail themselves fully of the natural advantages, general regimen and specialized treatments available at the well equipped spa.

2. Natural waters alone are not adequate for the treatment of cutaneous disorders. Spring waters coupled with a health resort regimen and adequate medical services are of inestimable value.

6. Rules for the Listing of American Health Resorts, Committee on Health Resorts, J. A. M. A. **118**: 379 (Jan. 31) 1942.
7. Markovitz, M.: Chemistry and Metabolism of the Skin, Philadelphia, The Blakiston Company, 1942.

3. It is necessary to add to the health resort regimen the services of a qualified dermatologist and the facilities required for the treatment of cutaneous diseases.

4. There are a number of diseases of the skin which should prove amenable to treatment at an approved spa. It is my belief that most patients with these diseases will derive immense benefit from proper treatment at a health resort.

5. To bathe in or to drink radioactive or radium waters is of unknown efficacy and may be a dangerous practice. It is not recommended for the treatment of any cutaneous disease.

40 East Sixty-First Street, New York 21.

Clinical Notes, Suggestions and New Instruments

PAROXYSMAL HYPERTENSION FROM PHEOCHROMOCYTOMAS

ALEXANDER BRUNSCHWIG, M.D.
Chicago

In recent years the several published studies of paroxysmal hypertension due to pheochromocytoma of the adrenal gland have well established this clinicopathologic entity.[1] The generally accepted treatment of such neoplasms is excision, usually with the entire adrenal gland which is the site of the tumor. The purpose of this report is to record the blood pressures and ultimate courses in a limited series of patients in whom excision of pheochromocytoma for paroxysmal hypertension was performed by me. These operations were performed via the anterior or abdominal route.[2] The pertinent facts are summarized in the accompanying table.

Summaries of Blood Pressure Readings Before and After Excision of Pheochromocytomas

Case	Sex	Age	History	Blood Pressure During Typical Attack of Paroxysmal Hypertension	Operation	Subsequent Course
1	♀	41	Attacks of dyspnea and asthenia, increasing in frequency during previous 8 years; finally one attack a day; normal blood pressure 138/96	220/130	4/21/37, excision of left adrenal with pheochromocytoma, 6 × 4 cm.	Well during 10 year period following operation; no recurrent attacks; blood pressure 130/90
2	♀	35	Severe attacks of headache, nausea and vomiting, tremor, clonic movements, blurred vision and sometimes syncope with expectoration of red frothy fluid for 3 years; normal blood pressure 140/90	240/140 (frequent attacks each day)	2/21/42, excision of right adrenal with pheochromocytoma, 6 × 5 cm.	No recurrence of attacks during 5 year period following operation; blood pressure 98/64
3	♀	?	One severe near-fatal attack of syncope; during recovery had pronounced pulmonary edema; normal blood pressure 140/85	295/155 (only attack observed preoperatively)	5/9/39, excision of right adrenal with tumor measuring 3.5 × 3 cm.	For months after operation blood pressure was 140-150/75-84; however, patient died 2½ years after operation, of "multiple sclerosis," in another institution; prior to death there were no further attacks of hypertension
4*	♀	20	No typical "attacks" usually associated with paroxysmal hypertension, but her physician noted that blood pressure which was usually 120/75 would rise on frequent occasions to 190/110; diabetes mellitus developed, also excess growth of hair on breasts and abdomen	190/110	7/24/44, excision of right adrenal with tumor measuring 5 × 3 cm.	Generally satisfactory; diabetes has not improved; blood pressure 122/92 (now stable); no change in distribution of hair

* Patient of Drs. W. E. Adams and Martin Goldner.

The fifth patient to be included in this report is a white woman aged 39, who had been under the care of Dr. Rudolph Hennemeyer (Chicago) for several years. Blood pressure readings were often observed to be approximately 90 systolic and 60 diastolic, but on the occasion of a routine visit the blood pressure was observed to be 300 systolic and 150 diastolic without accompanying symptoms. Because of this apparent and sudden elevation in blood pressure hospitalization was advised immediately (Sept. 7, 1940). The patient was bled with little reduction in pressure. Roentgenograms revealed a calcareous ring about 6 cm. in diameter in the region of the left adrenal gland. This was interpreted as partial calcification in an adrenal tumor (possibly pheochromocytoma). The day after admission a left hemiplegia developed suddenly, due undoubtedly to a cerebral hemorrhage. In view of the persistent high blood pressure I performed a laparotomy on Sept. 11, 1940, and a cystic tumor measuring 4.5 by 3.5 by 3 cm. and arising in the left adrenal gland was removed together with the gland. Subsequent to excision the blood pressure could not at first be obtained but a short time later returned to 150 systolic and 70 diastolic.

Study of the specimen showed the cyst to be composed of a fibrous wall in which a thin calcareous shell was present (fig. 1). The fluid content was yellow, turbid, mucoid in nature and measured 24 cc. in volume (fig. 2). Over the surface of the cyst were thinned out segments of adrenal parenchyma. Microscopic study showed that the cyst wall was fibrous and that there was no lining of epithelial cells.

Chemical analysis of the fluid from the cyst revealed: nonprotein nitrogen 46.2 mg., total nitrogen 0.93 Gm., and total protein 5.5 mg., per hundred cubic centimeters; chlorides 107 millimols per liter and glucose 134 mg. per hundred cubic centimeters.

In the months after the surgical operation there was some improvement in the hemiplegia, but the blood pressure gradually rose to a systolic range of 230 to 190 and a diastolic level of 120. In the winter of 1946 a Smithwick bilateral sympathectomy was performed without lowering the blood pressure, which varies now between 210 systolic and 140 diastolic and 180 systolic and 120 diastolic. Urinalysis is negative.

COMMENT

Removal of a pheochromocytoma which produces paroxysmal hypertension is apparently followed by permanent return of the blood pressure to normal levels, and there appear to be no permanent ill effects from the several attacks of hypertension engendered. Nor, from the limited series of patients observed, does there appear to be a danger of other untoward sequelae developing at a later period. The development of "multiple sclerosis" after the surgical operation in case 3 would seem to be coincidental. Case 4 presents three interesting features; namely, the absence of subjective symptoms related to the paroxysmal attacks of hypertension, the presence of diabetes mellitus both before and after excision of the tumor and the development of hirsutism, also not affected by removal of the tumor.

From the Department of Surgery, University of Chicago.
This study was aided by the Chas. H. and Mary F. S. Worcester Fund, University of Chicago.

1. Brunschwig, A.; Humphreys, E., and Roome, N.: The Relief of Paroxysmal Hypertension by Excision of Pheochromocytoma, Surgery 4:361, 1938.

2. Brunschwig, A., and Humphreys, E.: Excision of Pheochromocytoma Following Near Fatal Attack of Paroxysmal Hypertension, J. A. M. A. 115:355 (Aug. 3) 1940. Brunschwig, Humphreys and Roome.[1]

Cysts of the adrenal are rare. I have not been able to find records of a cyst similar to the one previously described (case 5). Its etiology remains obscure. There is no evidence to support the view that it represents an organized hemorrhage in the gland. Cystic tumors of the adrenal, but of different types,

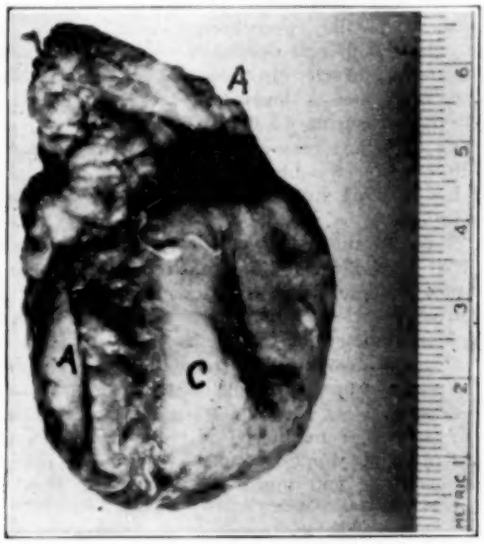

Fig. 1—Photograph of cyst (*C*) of right adrenal gland showing (*A*) portion of the adrenal gland about the cyst wall.

have been reported by H. Winter [3] (cystic lymphangioma) and Menon [4] (hemangioblastoma). The relationship, if any, between the sudden onset of sustained hypertension and the presence of the adrenal cyst in the case described herein remains obscure.

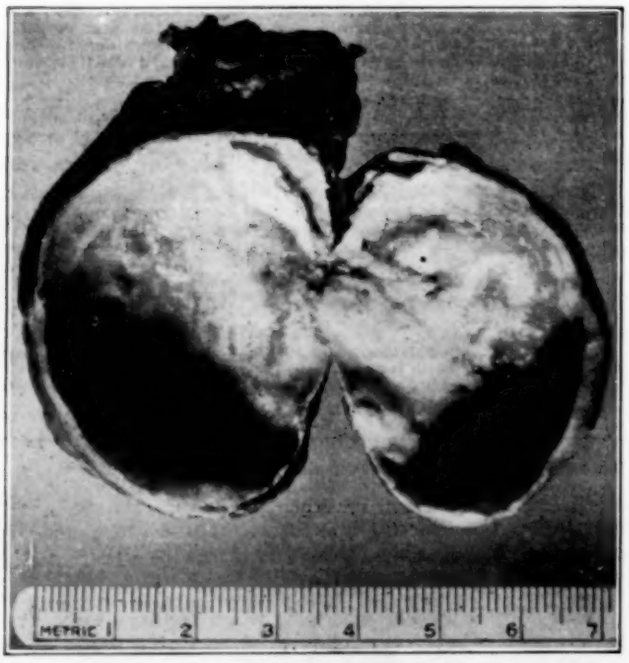

Fig. 2.—The opened cyst with white mottling due to calcification throughout most of the wall. Twenty-four cubic centimeters of mucoid turbid yellowish fluid were evacuated and analyzed.

SUMMARY

Four patients from whom pheochromocytomas of the adrenal gland were removed and in whom there were associated attacks of paroxysmal hypertension, were followed for ten, five, two and a half and two and a half years. No recurrences of hypertension were observed, and other ill effects were not observed to develop subsequently which might be ascribed to the tumors or the paroxysmal hypertension.

One instance of calcified adrenal cyst associated with the sudden onset of sustained hypertension is also recorded. The hypertension has persisted for six years and three months after removal of the cyst and involved adrenal gland, but there is no evidence that this tumor was the etiologic factor in the hypertension.

3. Winter, H.: Cystic Lymphangioma of the Adrenal, Centralbl. f. allg. Path. u. path. Anat. **63**: 305, 1935.
4. Menon, T. B.: Hemangioblastoma of the Adrenal Gland, J. Path. & Bact. **39**: 591, 1934.

Council on Physical Medicine

The Council on Physical Medicine has authorized publication of the following report. HOWARD A. CARTER, *Secretary.*

UNEX HEARING AID MODEL A ACCEPTABLE

Manufacturer: Nichols and Clark, Hathorne, Mass.

This instrument is self contained, the batteries being inserted in the back of the case. The case is of pressed metal in three pieces, assembled with Phillips screws. The back cover snaps on. The case tapers in thickness from the center to both ends and has rounded ends. Wearing clips are on the sides of the case. Two controls are placed at the top end of the case, one a volume control and the other a combination "on-off" and three-position tone switch. One receiver, a crystal type, was supplied.

Unex Hearing Aid, Model A.

Dimensions and Weight

Single unit with batteries: weight 6 ounces (170 Gm.), length 5¼ inches (14.0 cm.), thickness 1 1/16 inches (3.1 cm.), width 2½ inches (6.4 cm.).

Battery Data	Measured Voltage	Measured Current
A 1½ volts	1.4 volts	55 milliamperes
B 22½ volts	21 volts	0.65 milliampere

Acoustical Gain

Measurements of the gain in decibels in the sound pressure level referred to 0.0002 dyne/sq. cm. attached to a 2 cc. coupler over the pressure levels at the microphone were made at nineteen frequencies between 200 and 4,096 cycles, with the input level set at 0.02 dyne/sq. cm. The following figures are typical of the gains in decibels when the volume control was set full on:

Frequency.....	256	512	1,024	1,200	2,250	3,100	4,096 cycles
Tone controls							
"1 dot".....	42.5	40.5	43.0	46.5	33.5	37.0	35.0 db.
"3 dots".....	24.0	37.0	45.0	50.0	39.0	40.0	41.0 db.

Approximate values of maximum pressure levels, at four frequencies, observed on a 2 cc. coupler with volume control set at full gain for the "two dot" tone setting:

Frequency	Input Level	Maximum Output Level
600 cycles	60 decibels	100 decibels
1,024 cycles	60 decibels	106 decibels
1,200 cycles	70 decibels	109 decibels
2,048 cycles	70 decibels	93 decibels

Intelligibility tests were made with a normal hearing person so placed that the speaker could barely be heard with the hearing aid turned off. These tests indicated satisfactory performance.

It will be noted that the maximum gain obtained is somewhat lower than indicated in data supplied by the manufacturer. This may be accounted for by a difference in measuring technics. The manufacturer's data were computed from response curves of individual components of the hearing aid.

The Council on Physical Medicine voted to include the Unex Hearing Aid, Model A, in its list of accepted devices.

MEDICAL LICENSURE STATISTICS FOR 1946

FORTY-FIFTH ANNUAL PRESENTATION OF LICENSURE STATISTICS BY THE COUNCIL ON MEDICAL EDUCATION AND HOSPITALS OF THE AMERICAN MEDICAL ASSOCIATION

Victor Johnson, M.D., Secretary, and Anne Tipner

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Statistical compilations regarding medical licensure are presented annually in the State Board Number of THE JOURNAL. In the following pages will be found the report for the year 1946, which constitutes the forty-fifth annual presentation. Data are included pertaining to (*a*) medical examining and licensing boards of the United States, the District of Columbia, the territories and possessions of the United States, (*b*) boards of examiners in the basic sciences, (*c*) the National Board of Medical Examiners and (*d*) examining boards in the medical specialties.

The computations presented are based on official records received throughout the year from the medical examining and licensing agencies of all states, Alaska, Hawaii, Puerto Rico and the Virgin Islands; the nineteen boards of examiners in the basic sciences; the fifteen approved examining boards in the medical specialties; the National Board of Medical Examiners, and the homeopathic medical licensing boards of Connecticut, Delaware, Maryland and Louisiana.

The State Board Number of THE JOURNAL is made possible because of the wholehearted cooperation of all concerned with supplying this information. The Council and THE JOURNAL express their appreciation to those who have supplied these data and for other records furnished throughout the year.

The tables referring to medical licensing boards include figures for the number of candidates examined for medical licensure in 1946, the numbers licensed and the number who secured their first medical license and therefore represent additions to the medical profession. The state boards are discussed first, followed by the basic science boards, the National Board of Medical Examiners and the examining boards in the medical specialties.

STATE BOARDS OF MEDICAL EXAMINERS

LICENSES ISSUED

During the year 1946 there were 16,129 licenses to practice medicine issued by the medical examining boards of the forty-eight states, the District of Columbia, Alaska, Hawaii, Puerto Rico and the Virgin Islands. The number licensed in each state, by examination or by the endorsement of credentials, is shown in table 1. Of the 16,129 licenses issued, 6,559 were granted after examination and 9,570 by reciprocity and

TABLE 1.—*Licenses Issued, 1946*

	Examination	On the Basis of Reciprocity and Endorsement	Total
Alabama	31	148	179
Arizona	12	88	100
Arkansas	63	49	112
California	439	1,606	2,045
Colorado	77	158	235
Connecticut	49	269	318
Delaware	16	15	31
District of Columbia	44	289	333
Florida	318	0	318
Georgia	167	124	291
Idaho	53	3	56
Illinois	711	320	1,031
Indiana	139	111	250
Iowa	146	128	274
Kansas	109	123	232
Kentucky	84	98	182
Louisiana	189	94	283
Maine	45	46	91
Maryland	181	162	343
Massachusetts	60	374	434
Michigan	280	318	598
Minnesota	259	121	380
Mississippi	45	89	134
Missouri	250	223	473
Montana	17	57	74
Nebraska	80	55	135
Nevada	15	38	53
New Hampshire	20	104	124
New Jersey	116	425	541
New Mexico	1	58	59
New York	432	1,081	1,513
North Carolina	95	191	286
North Dakota	13	17	30
Ohio	290	390	680
Oklahoma	79	109	188
Oregon	53	148	201
Pennsylvania	460	258	718
Rhode Island	42	25	67
South Carolina	53	56	109
South Dakota	10	36	46
Tennessee	155	125	280
Texas	266	513	779
Utah	20	61	81
Vermont	14	64	78
Virginia	174	229	403
Washington	130	164	294
West Virginia	64	100	164
Wisconsin	123	241	364
Wyoming	0	38	38
Alaska, Hawaii, Puerto Rico and Virgin Islands	70	31	101
Totals	6,559	9,570	16,129

Marginal Number	SCHOOL	Alabama P	Alabama F	Arizona P	Arizona F	Arkansas P	Arkansas F	California P	California F	Colorado P	Colorado F	Connecticut P	Connecticut F	Delaware P	Delaware F	Dist. of Columbia P	Dist. of Columbia F	Florida P	Florida F	Georgia P	Georgia F	Idaho P	Idaho F	Illinois P	Illinois F	Indiana P	Indiana F	Iowa P	Iowa F	Kansas P	Kansas F	Kentucky P	Kentucky F	Louisiana P	Louisiana F	Maine P	Maine F	Maryland P	Maryland F	Massachusetts P	Massachusetts F	Michigan P	Michigan F	Minnesota P	Minnesota F	Marginal Number
		1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18		19		20		21		22		
	ARKANSAS																																													
1	University of Arkansas School of Medicine					61	0	1	0			1	0					4	0			1	0	1	0																					1
	CALIFORNIA																																												
2	College of Medical Evangelists							54	1	3	0							3	0			2	0	1	0											1	0	2	0	1	0	3	0			2
3	Stanford University School of Medicine							61	0			1	0							1	0									1	0													3
4	University of California Medical School							139	1																																			4
5	University of So. California School of Medicine							67	0																																	1	0	5
	COLORADO																																												
6	University of Colorado School of Medicine	1	0					4	0	53	0											1	0							1	0											1	0	2	0	6
	CONNECTICUT																																												
7	Yale University School of Medicine											2	1	1	0	1	0	4	0																	4	0	1	0					7
	DISTRICT OF COLUMBIA																																												
8	George Washington University School of Med.							3	0							5	0	4	2	1	0			2	0													2	0	1	0					8
9	Georgetown University College of Medicine											2	0			5	0	4	1					1	0													11	0	1	0			1	0	9
10	Howard University College of Medicine	2	0					1	0							25	0	1	0	2	0			6	0					2	0			3	0			12	0	1	1	2	0	1	0	10
	GEORGIA																																	1	0											11
11	Emory University School of Medicine																	23	10	66	0																									11
12	University of Georgia School of Medicine																	25	5	68	0			1	0																					12
	ILLINOIS																																												
13	Loyola University School of Medicine							11	0	1	0	1	0					4	2					89	0	2	0			1	0	1	0									1	0	4	0	13
14	Northwestern University Medical School	3	0					16	0	2	0					1	0	7	2	1	0	3	0	142	1	2	0			1	0							1	0			5	0	10	0	14
15	University of Chicago, The School of Medicine							5	0			2	0					2	0	1	0	3	0	62	1									1	0					2	0	2	0	3	0	15
16	University of Illinois College of Medicine	1	0					16	0	1	0							11	2					280	1	3	0			2	0	1	0	2	0							3	0	9	0	16
	INDIANA																																												
17	Indiana University School of Medicine	1	1															3	1			2	0	1	0	81	2															1	0	1	0	4	0	17
	IOWA																																												
18	State University of Iowa College of Medicine	1	0					3	0									6	1	1	0			3	0			40	2															2	0	18
	KANSAS																																												
19	University of Kansas School of Medicine							1	0													1	0	2	0					76	0									1	0			9	0	19
	KENTUCKY																																												
20	University of Louisville School of Medicine	1	0					1	0									4	1	1	1	1	0	4	0							157	0									1	0	1	0	20
	LOUISIANA																																												
21	Louisiana State University School of Medicine											1	0					7	0					1	0									64	0									1	0	21
22	Tulane University of Louisiana School of Med.	6	0					4	0									28	0					2	0					1	0			110	1									1	0	22
	MARYLAND																																												
23	Johns Hopkins University School of Medicine							3	0			2	0					9	3					1	0													2	0	54	0	0	1			1	0	23
24	University of Maryland School of Medicine and College of Physicians and Surgeons							1	0			3	0	1	0			12	1																	1	0	83	0	0	1					24
	MASSACHUSETTS																																												
25	Boston University School of Medicine	1	0					1	0									4	0					1	0	1	0							1	0	2	0			2	0					25
26	Harvard Medical School	1	0					7	0			2	0			1	0	7	1	4	0	2	0	9	0	2	0			1	0	1	0	1	0	6	0	4	0	14	1	3	0	26	0	26
27	Tufts College Medical School	1	0					1	0			1	0					5	1																	5	0	1	0	9	0					27
	MICHIGAN																																												
28	University of Michigan Medical School							1	0									6	3			2	0	4	0					1	0											132	0	1	0	28
29	Wayne University College of Medicine																							1	0																	1	0	47	0			29
	MINNESOTA																																												
30	University of Minnesota Medical School							3	0	1	0							3	0					11	0					4	0							1	0			1	0	18	9	30
	MISSOURI																																												
31	St. Louis University School of Medicine							8	1									1	0			2	0	4	0																	0	2			4	0	31
32	Washington University School of Medicine							4	0	1	0							4	1			3	0	3	0					1	0											1	0			2	0	32
	NEBRASKA																																												
33	Creighton University School of Medicine							15	1	1	0											2	0	1	0			15	0	4	0											1	0	3	0	33
34	University of Nebraska College of Medicine							3	0	1	0							1	0			4	0	1	1	2	0			1	0			1	0									1	0	34
	NEW YORK																																												
35	Albany Medical College																	2	0	1	0																									35
36	Columbia University Coll. of Phys. and Surgs.							2	0	1	0	3	0	1	0			5	0	2	0			2	0											2	0	1	0	1	0	1	0			36
37	Cornell University Medical College							2	0			1	0					7	0	2	0			2	0																	2	0			1	0	37
38	Long Island College of Medicine											2	0					12	1					1	0							1	0													38
39	New York Medical College, Flower and Fifth Avenue Hospitals																	5	1					1	0																					39
40	New York University College of Medicine	1	0					1	0			2	0					16	2	1	0			1	0					1	0									2	0					40
41	Syracuse University College of Medicine																	3	0					2	0													1	0					2	0	41
42	University of Buffalo School of Medicine																	1	1											1	0													1	0	42
43	University of Rochester School of Medicine and Dentistry							2	0			0	1					1	0	1	0			2	0					1	0	1	0			1	0	2	0	2	0			1	0	43
	NORTH CAROLINA																																												
44	Bowman Gray School of Medicine of Wake Forest College																	1	0											1	0															44
45	Duke University School of Medicine	1	0					1	0					1	0			9	2																	1	0									45
	OHIO																																												
46	Ohio State University College of Medicine			2	0			1	0									6	1					3	0																			2	0	46
47	University of Cincinnati College of Medicine							3	0			1	0					7	1																											47
48	Western Reserve University School of Medicine	1	0					1	0			1	0					2	1			2	0	2	0																			1	0	48
	OKLAHOMA																																												
49	University of Oklahoma School of Medicine											2	0					1	0					2	0																					49
	OREGON																																												
50	University of Oregon Medical School					1	0	10	0											9	0			1	0													1	0			1	0	2	0	50
	PENNSYLVANIA																																												
51	Hahnemann Med. Coll. and Hosp. of Phila.							10	0			5	0	4	0			9	3	3	0			2	0	1	0													13	0	4	1	1	0			51
52	Jefferson Medical College of Philadelphia							1	0			3	0	4	0			11	0			1	0															2	0	2	0	0	1			1	0	52
53	Temple University School of Medicine	1	0					4	0					2	0			9	2			1	0	2	0															1	0	0	1	1	0	4	0	53
54	University of Pennsylvania School of Medicine	3	0					1	0			1	0	2	0			9	0	0	1	1	0	2	0	1	0									1	0	1	0	1	0	1	0	3	0	54
55	University of Pittsburgh School of Medicine							2	1			1	0					6	0																							1	0	1	0	55
56	Woman's Medical College of Pennsylvania							2	0							1	0	1	0	1	0			2	0																			1	0	56
	SOUTH CAROLINA																																												
57	Medical College of the State of South Carolina																	3	1																											57
	TENNESSEE																																												
58	Meharry Medical College							1	0			1	0											10	1					1	0			1	0					1	1	1	0			58
59	University of Tennessee College of Medicine	1	0															11	3	1	0	1	0	1	0																					59
60	Vanderbilt University School of Medicine	1	0															4	0	1	0			1	0																	1	0			60
		1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18		19		20		21		22	

P—Passed; F—Failed.

Marginal Number	Mississippi	Missouri	Montana	Nebraska	Nevada	New Hampshire	New Jersey	New Mexico	New York	North Carolina	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina	South Dakota	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin	Wyoming	Alaska, Hawaii and Puerto Rico	Totals	Examined—Passed	Examined—Failed	Percentage—Failed	No. Boards Examined by	Marginal Number
	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F						
1									4 0											13 1								1 0	88	87	1	1.1	9	1
2															1 0					3 0				3 0				1 0	79	78	1	1.3	13	2
3	1 0			1 0																1 0								0 1	68	67	1	1.5	8	3
4			1 0		0 1											2 0												2 0	146	144	2	1.4	5	4
5					1 1																								70	69	1	1.4	3	5
6	1 0	2 0													1 0					3 0							1 0		71	71	0	0.0	12	6
7		1 0							2 0			1 0											1 0					19	18	1	5.3	10	7
8	3 0								3 1						1 0 1 0						2 0			4 0 1 0				36	33	3	8.3	14	8
9	1 0					3 1 8 0			9 6						4 0 3 0					1 0			2 0 1 0 2 0				2 0	69	61	8	11.6	18	9
10	1 0 13 0						4 1		8 5 2 0			2 0			14 1 1 0 1 0														112	104	8	7.1	21	10
11	1 0								1 0																				102	92	10	9.8	5	11
12															0 1														100	94	6	6.0	4	12
13	1 0				1 0		1 0		6 3			7 0		1 0 3 0						1 0				1 0				1 0	143	138	5	3.5	20	13
14	1 0	1 0 2 0			1 0				2 1		1 0 4 0			1 0 3 0				3 0		3 0 1 0				24 0 3 0 9 1			4 0	262	257	5	1.9	29	14
15	1 0 1 0					3 0			2 1 1 0			4 0		0 1 1 0									1 0					8 0	108	105	3	2.8	20	15
16						1 0			3 0		1 0			2 0						1 0				6 0		1 0		1 0	348	345	3	0.9	19	16
17																									2 0				100	96	4	4.0	9	17
18																									1 0 1 0			1 0	64	60	4	6.2	10	18
19									1 1															3 0					95	94	1	1.1	8	19
20	1 0				1 0				0 1															3 0 3 0				2 0	184	181	3	1.6	15	20
21	3 0								1 1																				79	78	1	1.3	7	21
22	6 0				1 0				2 1											3 0								1 0	167	165	2	1.2	12	22
23	2 0		1 0				1 0			2 0						1 0							1 0					2 0	86	82	4	4.7	15	23
24							1 0			4 0					2 0 1 0 1 0								1 0 3 0				5 0	121	119	2	1.7	14	24
25					1 0				2 0							1 0							4 0					1 0	22	22	0	0.0	13	25
26	1 0 3 0								4 2 6 0			2 0			3 0					2 0 1 0			2 0		2 0		2 0	99	95	4	4.0	28	26
27					3 0 1 0				1 1						5 0										1 0		1 0	37	35	2	5.4	13	27
28						1 0			1 0		1 0									2 0			2 0				5 0	162	159	3	1.9	13	28
29									1 0						1 0					2 0								53	53	0	0.0	6	29
30	1 0					1 0			0 1	2 0					1 0					1 0			3 0					223	222	1	0.4	15	30
31	104 0								6 3						1 0 4 0 1 0 1 0					1 0			1 0		2 0		5 0	151	145	6	4.0	16	31
32	89 0 1 0				1 0				1 0 2 0															2 0				117	116	1	0.9	15	32
33	0 1 1 0 9 1					1 0			3 1	2 0		1 1					1 0		1 0 1 0				2 0		1 0			70	65	5	7.1	20	33
34	2 0	70 2							0 1						1 0				1 0 1 0				1 0 1 0					96	92	4	4.2	17	34
35									0 1																		1 0	5	4	1	20.0	4	35
36					1 0 2 0				8 0			1 0			2 0				1 0				1 0					37	37	0	0.0	18	36
37						1 0			10 2 1 0					1 0		1 0							1 0					34	32	2	5.9	13	37
38					5 0				21 3							1 0							1 0				1 0	49	45	4	8.2	9	38
39						1 0			3 5						1 0 1 0								1 0					19	13	6	31.6	7	39
40	1 0				1 0 7 0				22 7 1 0														1 0 1 0					68	59	9	13.2	15	40
41									12 6																		2 0	28	22	6	21.4	6	41
42									2 0																			6	5	1	16.7	4	42
43					3 0 2 0				7 3			1 0			1 0				1 0 1 0 1 0				2 0					37	33	4	10.8	20	43
44									43 0																			45	45	0	0.0	3	44
45	1 0								1 1 6 0 1 0 1 0						3 0		2 0		1 0						2 0			34	31	3	8.8	14	45
46									0 2			74 0			1 0										1 0			93	90	3	3.2	9	46
47									5 1			72 1													2 0 1 0			94	91	3	3.2	7	47
48												80 2			2 0 1 0													96	93	3	3.1	10	48
49									2 0			68 0														1 0			76	76	0	0.0	6	49
50	1 0			1 0									42 0 1 0							1 0			22 0		1 0			94	94	0	0.0	14	50
51	1 0				1 0 17 0				10 7			17 0			60 1 3 0					1 0 2 0				1 0 1 0		3 0	181	169	12	6.6	22	51
52	3 0 4 0 1 0					15 0 1 0			3 3 4 0			3 0			80 0 5 0 2 0				1 0				3 0 7 0			5 0	166	162	4	2.4	24	52
53					1 0 1 0 8 0				3 2 1 0 4 0			1 0			94 0				3 0		2 0 1 0			2 0 4 0 2 0			2 0	159	154	5	3.1	25	53
54	2 0 3 0 2 0				1 0		8 0		5 2 8 0 1 0 1 0						83 0 1 0					2 0 3 0			2 0 1 0			1 0	154	151	3	1.9	30	54
55												3 0			76 0											0 1	92	90	2	2.2	8	55
56									2 0			1 0			13 0													24	24	0	0.0	9	56
57	1 0								3 0										39 0					1 0					48	47	1	2.1	5	57
58	5 0								1 2						1 0		1 0		27 0 1 0					1 0					57	53	4	7.0	14	58
59	15 0 5 0				0 1				1 0 1 0						1 0				81 1 1 0				2 0 1 0					128	123	5	3.9	15	59
60	2 0								0 1										44 0										55	54	1	1.8	8	60

23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50

Marginal Number	SCHOOL	1 Alabama P	F	2 Arizona P	F	3 Arkansas P	F	4 California P	F	5 Colorado P	F	6 Connecticut P	F	7 Delaware P	F	8 Dist. of Columbia P	F	9 Florida P	F	10 Georgia P	F	11 Idaho P	F	12 Illinois P	F	13 Indiana P	F	14 Iowa P	F	15 Kansas P	F	16 Kentucky P	F	17 Louisiana P	F	18 Maine P	F	19 Maryland P	F	20 Massachusetts P	F	21 Michigan P	F	22 Minnesota P	F	Marginal Number
	TEXAS																																											
61	Baylor University College of Medicine							2	0																																	2	0	61
62	Southwestern Medical College of the Southwestern Medical Foundation																																											62
63	University of Texas School of Medicine					1	0											2	0																							7	0	63
	UTAH																																											
64	University of Utah School of Medicine							5	0													1	0																					64
	VERMONT																																										
65	University of Vermont College of Medicine											2	0					1	0			1	0																			1	0			65
	VIRGINIA																																										
66	Medical College of Virginia																	11	2					1	1											1	0							4	0	66
67	University of Virginia Department of Medicine									1	0							6	1															1	0					1	0			67
	WISCONSIN																																										
68	Marquette University School of Medicine							8	0									1	0			1	0	1	0															1	0	2	0	9	0	68
69	University of Wisconsin Medical School			1	0			5	0	1	0							1	0	1	0	1	0	4	0																	2	0	69
	CANADA																																										
70	Dalhousie University Faculty of Medicine							1	0									1	0																	3	1			1	0			1	0	70
71	Laval University Faculty of Medicine																																			4	0			1	0					71
72	McGill University Faculty of Medicine							4	0			3	0					2	0			1	0	3	0									1	0	1	0	5	0			1	0	2	0	72
73	Queen's University Faculty of Medicine																																							2	0					73
74	University of Alberta Faculty of Medicine																																									2	0	74
75	University of Manitoba Faculty of Medicine							3	0									1	0															1	0							1	0	3	0	75
76	University of Montreal Faculty of Medicine											1	0																							1	0	1	1							76
77	University of Toronto Faculty of Medicine	1	0					2	0									1	0	1	0			1	0	1	0													3	0			2	0	77
78	University of Western Ontario Faculty of Med.							1	0									1	1					1	0																	1	0	78
	OTHERS																																										
79	Foreign Medical Faculties							16	6	5	0	3	7			1	0			3	0			19	23	0	1									3	2	6	4	6	11					79
80	Extinct Medical Schools							5	0							1	0	11	2	3	0	5	0	3	1									1	0			1	0	2	0			8	0	80
81	Unapproved Schools									5	0	5	1	0	1			1	0					45	3	43	13	1	0											24	142					81
82	Totals	20		13		63		541		77		65		17		41		435		169		54		784		155		59		102		166		190		49		208		232		215		313		82
83	Totals—Examined—Passed	20		12		63		530		77		55		16		41		373		167		54		751		139		56		102		166		189		45		204		89		215		313		83
84	Totals—Examined—Failed	0		1		0		11		0		10		1		0		62		2		0		33		16		3		0		0		1		4		4		163		0		0		84
85	Percentage Failed	0.0		7.7		0.0		2.0		0.0		15.4		5.9		0.0		14.3		1.2		0.0		5.0		10.3		5.1		0.0		0.0		0.5		8.2		1.9		64.7		0.0		0.0		85
		1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18		19		20		21		22		

P—Passed; F—Failed.

endorsement of state licenses or the certificate of the National Board of Medical Examiners. These figures represent an unprecedented increase over all previous years in both groups.

The greatest number of licenses during the last calendar year were issued in California, 2,045. Both New York and Illinois licensed more than 1,000. Five other states registered over 500; Michigan, New Jersey, Ohio, Pennsylvania and Texas. No state licensed fewer than 30. Comparison of like data presented for the year 1945 [1] indicates an increase in all but three states: Arkansas, Indiana and Tennessee. The increase was spectacular not only in certain states with large urban populations but also in some rural states. Twelve instances are cited indicating the state and the number licensed in 1945 as compared with the year 1946:

	1945	1946
Alabama	85	179
Arizona	32	100
Maine	21	91
Mississippi	70	134
Montana	13	74
New Hampshire	25	124
North Dakota	8	30
Oregon	61	201
Virginia	83	403
Washington	87	294
West Virginia	37	164
Wyoming	6	38

While the more pronounced increase was evident in the group licensed without examination, the group who were registered after written examination was more than 1,000 greater than in 1945. These figures apparently reflect mainly the migration of veteran medical officers who are not returning to their original state of practice and those medical officers representing recent graduates who were licensed prior to entry on active duty with the armed forces but returned to a new state. Previous compilations indicated that the accelerated program in medical schools (July 1, 1942 to July 1, 1945) produced 20,662 physicians in this three year cycle, while in the four years 1942 to 1945 inclusive 35,821 physicians received licenses. The graduation of one extra class under the accelerated program and the slight increase in enrolment in all medical schools, while intended primarily for the production of additional physicians to aid in the care of the armed forces, is now probably providing a greater physician-civilian population ratio in the country generally.

However, the figures presented in this table, particularly in the endorsement group, do not represent entirely individuals but include persons who may have been licensed in more than one state during a given year; nor does the total represent additions to the medical profession, since a physician previously licensed in one state may be licensed by examination in a nonreciprocating state. In tables 12, 13 and 14 (see pages 271 and 272) can be noted the number who secured licenses for the first time and represent additions to the medical profession in the United States and its territories and possessions.

Totals for eleven previous years and for 1946 by all methods of licensure are shown for comparison in table 3. The high figures for the years from 1936 to 1941 in the annual number of licenses issued were

1. J. A. M. A. **131**: 109-139 (May 11) 1946.

Marginal Number	Mississippi	Missouri	Montana	Nebraska	Nevada	New Hampshire	New Jersey	New Mexico	New York	North Carolina	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina	South Dakota	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin	Wyoming	Alaska, Hawaii and Puerto Rico	Totals	Examined—Passed	Examined—Failed	Percentage—Failed	No. Boards Examined by	Marginal Number
	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F						
61	...	...	...	...	...	...	1 0	...	..	...	...	...	...	...	...	...	...	1 0	...	47 1	...	...	...	...	...	...	...	...	...	54	53	1	1.9	5	61
62	...	...	...	...	...	...	...	...	..	...	...	33 0	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	33	33	0	0.0	1	62
63	...	...	...	...	...	...	...	...	..	...	...	83 0	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	93	93	0	0.0	4	63
64	...	...	...	...	...	...	...	...	..	...	...	...	...	...	...	...	...	...	...	64 0	...	...	...	...	...	...	...	...	70	70	0	0.0	3	64
65	...	...	...	...	...	1 0	1 0	...	..	...	...	...	...	...	1 0	...	...	...	...	...	...	5 0	...	1 0	...	...	...	...	14	14	0	0.0	9	65
66	...	1 0	...	...	...	...	...	...	..	4 0	...	...	...	...	2 0	...	1 0	...	...	...	...	92 0	...	20 0	...	...	...	3 0	143	140	3	2.1	11	66
67	1 0	...	...	...	...	...	1 0	...	..	2 0	...	...	...	...	...	...	...	...	...	...	...	66 0	...	3 0	...	...	...	...	83	82	1	1.2	9	67
68	...	...	...	...	2 0	...	...	...	4	6	...	1 0	...	...	...	1 0	...	...	...	1 0	...	...	7 0	...	31 0	...	7 0	83	77	6	7.2	15	68
69	...	1 0	...	...	...	...	...	...	..	...	...	2 0	...	2 0	...	...	...	...	...	1 0	...	...	...	...	66 0	...	1 0	89	89	0	0.0	14	69
70	...	...	...	...	...	0 1	...	...	3	0	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	12	10	2	16.7	7	70
71	...	...	...	...	...	1 0	2 0	...	3	6	...	...	...	...	...	...	...	...	...	...	...	...	1 0	...	...	...	...	...	18	12	6	33.3	6	71
72	...	...	1 0	...	2 0	2 0	...	...	7	4	2 0	...	2 0	...	...	2 0	...	...	...	...	...	...	...	3 0	...	...	...	...	48	44	4	8.3	17	72
73	...	...	...	...	...	1 0	...	...	2	0	1 0	...	1 0	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	7	7	0	0.0	5	73
74	...	...	1 0	...	...	...	...	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	3	0	0.0	2	74
75	...	...	...	...	...	...	...	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1 0	...	...	...	...	10	10	0	0.0	6	75
76	...	...	...	...	...	2 1	...	...	0	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	8	5	3	37.5	5	76
77	...	...	...	...	...	...	...	...	4	1	...	...	...	...	2 0	...	...	...	...	...	...	...	1 0	1 0	...	...	...	...	21	20	1	4.8	12	77
78	...	...	...	...	...	1 0	...	...	..	...	...	...	...	...	1 0	...	...	...	...	1 0	...	...	...	...	...	...	...	...	8	7	1	12.5	7	78
79	...	8 0	...	1 0	...	0 1	12 3	...	106	209	...	3 0	...	...	3 0	5 0	...	...	...	10 4	...	...	1 1	1 0	...	...	...	8 2	494	220	274	55.5	22	79
80	...	1 0	...	...	...	...	...	...	7	2	...	2 0	1 0	...	1 0	1 0	...	...	...	1 0	...	...	5 0	1 0	1 0	...	1 0	68	63	5	7.3	24	80
81	4 0	...	...	0 2	...	...	9 1	...	116	78	...	53 7	...	0 1	...	...	...	...	...	42 8	...	...	11 1	2 0	...	1 0	...	...	620	362	258	41.6	17	81
82	45	251	17	85	18	24	121	1	817	95	13	350	68	53	466	40	53	10	157	280	78	5	176	130	64	124	0	76	7,605	.....	...	...	..	82
83	45	250	17	80	15	20	116	1	432	95	13	340	68	50	463	40	53	10	156	266	78	5	174	130	64	123	0	72	.....	6,853	...	...	..	83
84	0	1	0	5	3	4	5	0	385	0	0	10	0	3	3	0	0	0	1	14	0	0	2	0	0	1	0	4	.....	.....	752	...	..	84
85	0.0	0.4	0.0	5.9	16.7	16.7	4.1	0.0	47.1	0.0	0.0	2.9	0.0	5.7	0.6	0.0	0.0	0.0	0.6	5.0	0.0	0.0	1.1	0.0	0.0	0.8	0.0	5.3	.....	.....	...	9.9	..	85
	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50						

due to the licensure of foreign graduates. In succeeding years the accelerated program in medical schools increased the numbers annually licensed, the high for this period as for previous years being 1944, when 9,652 were licensed. This figure was surpassed in 1946 by 6,477. In 1946 there were 1,015 more licenses issued after examination than in 1945 and 5,955 more by endorsement of credentials.

TABLE 3.—*Licenses Issued, 1935-1946*

	Examination	Reciprocity and Endorsement	Total
1935	5,725	2,194	7,919
1936	6,275	2,772	9,047
1937	6,629	3,204	9,833
1938	6,557	2,956	9,513
1939	6,400	2,872	9,272
1940	6,289	2,866	9,155
1941	6,055	2,759	8,814
1942	6,142	2,469	8,611
1943	6,060	2,339	8,399
1944	7,058	2,594	9,652
1945	5,544	3,615	9,159
1946	6,559	9,570	16,129
Totals	75,293	40,210	115,503

It does not follow that all physicians certified in a given year after examination were tested in that year. In twenty-three states, the District of Columbia, Alaska, the Canal Zone, Hawaii and Puerto Rico the internship is a requisite for practice, but in some of them a physician is permitted to take an examination before completion of the internship; if the examination is successful, the license is withheld until completion of the internship. Licenses are also withheld in some states for proof of citizenship and other technicalities. In other instances the licenses of those examined in December are dated and issued in the following year. The statistics in table 1, therefore, include some persons who were examined late in 1945, and even a few in previous years. Consequently, figures in this table will not entirely correspond with those of later tables which deal with physicians examined for medical licensure in 1946.

CANDIDATES EXAMINED BY MEDICAL EXAMINING BOARDS

In table 2 are recorded figures referring to those examined for medical licensure in 1946 by individual states, the District of Columbia, Alaska, Hawaii and Puerto Rico, indicating the numbers who passed and failed in each state, the medical school of graduation, the percentage of failures by schools and the number of states in which graduates of a given school were examined. Medical schools in the United States which are no longer in existence, foreign faculties of medicine and unapproved schools are not listed by name, but the numbers examined in each state in these three categories are indicated at the bottom of the table.

Throughout the year 7,605 were examined, of whom 6,853 passed and 752 failed. Candidates represented sixty-nine approved medical schools in the United States, nine approved medical schools of Canada, eighty-six faculties of medicine and four licensing corporations of other countries, eight medical schools now extinct, six unapproved institutions and seven

schools of osteopathy. Osteopaths who were granted the privilege to practice medicine, surgery or both by the medical examining boards are included in these statistics. Osteopaths in other states who obtained the legal right to special practice by the osteopathic board are excluded from these compilations.

Examination dates and reciprocity meetings were scheduled at more frequent times by many states in order to facilitate the physicians to commence the practice of medicine at an earlier date. Executive officers and members of examining boards are to be commended for thus assisting medical officers and others. This cooperation, in view of the increase in volume of applications, is noteworthy.

TABLE 4.—*Graduates of Medical Schools in Canada Examined for Licensure in the United States, 1946*

	Examined	Passed	Failed
Alabama	1	1	0
California	11	11	0
Connecticut	4	4	0
Florida	7	6	1
Georgia	1	1	0
Idaho	1	1	0
Illinois	5	5	0
Indiana	1	1	0
Kentucky	2	2	0
Louisiana	2	2	0
Maine	15	13	2
Maryland	3	3	0
Massachusetts	6	6	0
Michigan	2	2	0
Minnesota	9	9	0
Montana	2	2	0
Nevada	2	2	0
New Hampshire	8	6	2
New Jersey	3	3	0
New York	31	19	12
North Carolina	3	3	0
Ohio	3	3	0
Pennsylvania	5	5	0
Texas	1	1	0
Virginia	1	1	0
Washington	5	5	0
West Virginia	1	1	0
Totals	135	118	17

TABLE 5.—*Source of Candidates Examined for Licensure in the United States, 1946*

Medical Schools	Number of Schools	Number Examined	Number Passed	Number Failed	Percentage Failed
Approved in United States	69	6,288	6,090	198	3.1
Approved in Canada	9	135	118	17	12.6
Extinct	8	68	63	5	7.3
Foreign	90	494	220	274	55.5
Unapproved schools	13	620	362	258	41.6
Totals	188	7,605	6,853	752	9.9

The 7,605 examinees represented 6,288 graduates of approved medical schools in the United States, of whom 3.1 per cent failed; 135 graduates of approved Canadian schools, 12.6 per cent failures; 68 who graduated from medical schools no longer operating, with 7.3 per cent failures; 494 graduates of faculties of medicine located in countries other than the United States and Canada, 55.5 per cent of whom failed, and 620 graduates of unapproved institutions, with 41.6 per cent failures. The numbers examined in each of these categories were in excess of those examined in 1945. The majority of physicians in the classification of extinct medical schools were graduates of Rush Medical College. Massachusetts, which in former years was compelled by law to license any person applying for licensure and as a result tested the great majority of graduates of unapproved schools in previous years, examined fewer in 1946. The state approving authority in Massachusetts, created some years ago, has ruled that only those graduates who matriculated in medical schools not acceptable to that body prior to Jan. 1, 1941 will be eligible for licensure examinations in the future. Legislation passed in New York, Ohio and Virginia accounts for the increase in the total number of graduates of unapproved schools tested for licensure.

As in table 1, the 7,605 physicians and others examined for medical licensure do not represent an equal number of individuals, since a candidate might take an examination in more than one state and is counted in each state. However, if a candidate fails more than once in a given state within the year he is counted in that state as only one failure.

The greatest number of graduates of any one school examined was 348, representing the University of Illinois College of Medicine, 281 of whom were examined in Illinois and 67 in eighteen other states. More than 175 graduates of four other schools applied for licenses by examination last year, namely Northwestern University (262) in twenty-nine states, University of Minnesota (223) in fifteen states, University of Louisville (184) also in fifteen states, and Hahnemann Medical College (181) in twenty-two states. One hundred or more graduates of seventeen other schools also were tested during the year.

Thirteen approved schools in the United States had no failures before medical licensing boards, thirty-five less than 5 per cent and fourteen between 5 and 10 per cent. There were seven schools with 10 per cent or more failures in state examinations. The highest percentage of failures for any one school (with relatively few examined) was 31.6. These failure figures and percentages are modified by data on those who were examined by the National Board of Medical Examiners in its final examinations as well as those passing state tests (table 6, page 261).

The Medical College of Alabama, which has developed an approved four year program and graduated its first class in October 1946, had none of its graduates appear before licensing boards in 1946.

Three of the five homeopathic boards in existence examined 10 candidates: Connecticut 5, Delaware 4 and Maryland 1. The homeopathic and eclectic boards in Arkansas did not examine any one in 1946, while the homeopathic board in Louisiana registered only by reciprocity.

Graduates of the University of Pennsylvania were examined in the greatest number of states, thirty. Northwestern alumni were tested in twenty-nine states and Harvard Medical School in twenty-eight states. All other schools had their graduates examined in fewer than twenty-six states. Eight schools had graduates examined in fewer than five states. All the graduates of Southwestern Medical College examined (33) were tested in Texas.

A total of 135 graduates of the nine approved medical schools in Canada appeared for licensure in the United States in 1946 in twenty-seven states. The figures for individual states are given by schools in table 1 and by totals in table 4. Of the 135 examinees, 17 (12.6 per cent) failed. New York examined 31, Maine 15, California 11 and all other states fewer than 10. The highest percentage of failures was 37.5, in New York. Three Canadian schools had no failures before United States licensing boards. The lowest failure percentage was 4.8. The remaining schools had percentages higher than 8.

Graduates of osteopathic schools were examined by the medical boards of Colorado, Connecticut, Delaware, Indiana, Massachusetts, Nebraska, New Jersey, New York, Ohio, Oregon, Texas, Virginia and Wisconsin, while graduates of unapproved schools were examined in Florida, Illinois, Iowa, Massachusetts, Mississippi, New York, Ohio, Virginia and Washington. There were 620 graduates of unapproved and osteopathic schools, of whom 362 passed and 258, or 41.6 per cent, failed. The numbers of successful candidates in each of these two categories can be ascertained by reference to tables 24 and 25, page 277.

Graduates of faculties of medicine of other countries were examined in twenty-two states. There were 494 such graduates, with 274 (55.5 per cent) failures.

Sixty-eight graduates of medical schools no longer in operation were tested in twenty-four states, of whom 63 passed and 5 (7.3 per cent) failed.

In all five categories mentioned, 7,605 appeared before medical examining boards in 1946, of whom 6,853 passed and 752, or 9.9 per cent, failed. The number tested exceeded the 1945 figure by 1,015.

Totals for the five categories are given in table 5. As already mentioned, from the United States approved schools there were 3.1 per cent who failed, as did 12.6 per cent of the Canadian graduates and 7.3 per cent representing extinct schools. The greatest percentage of failures represented two groups, foreign schools and unapproved schools. In these two groups 55.5 and 41.6 per cent respectively failed.

Elsewhere (see table 12, page 271) are given figures referring to actual licentiates and additions to the medical profession.

CONSOLIDATED EXAMINATIONS

A combination of the individual school results for the two groups appearing for the state medical board examinations and for part III of the examinations of the National Board of Medical Examiners is given in table 6. This table presents a more accurate picture of the performance of physicians in licensure examinations than is given in the preceding tables. It can be noted that in some instances schools having a high percentage of failures before state licensing boards had few, if any, failures before the National Board. In 1946 there were 6,288 graduates of approved medical schools in the United States examined by state boards, of whom 198, or 3.1 per cent, failed. In the same period 1,588 graduates of these institutions appeared for part III of the examination of the National Board, of whom 21, or 1.3 per cent, failed. In the consolidated figures the failures from approved medical schools in the United States were 2.8 per cent.

Of the Canadian graduates 12.6 per cent failed state board tests and 10.1 per cent failed the combined tests. Only 3 graduates of extinct approved medical schools and 7 graduates of foreign medical schools were tested by the National Board; no comparison can be made of these two groups with similar groups examined by state licensing boards. The National Board does not admit to its examinations the graduates of unapproved medical schools in the United States, and from foreign schools it admits only the graduates of the university medical schools of Great Britain and Ireland, provided these graduates have been licensed to practice in the country in which the school attended is located.

The total of all examined before medical licensing boards in the United States in 1946 was 7,605, of whom 6,853 passed and 752, or 9.9 per cent, failed. For both groups—state boards and the National Board—9,237 were examined; 8,464 passed and 773 (8.4 per cent) failed. The total percentage of failures was not greatly

TABLE 6.—*Consolidated Examinations, State Medical Examining Boards and the National Board of Medical Examiners, 1946*

School	Results by Medical Examining Board Tests		Part III Examination of National Board of Medical Examiners		Total Examined	Totals		
	P	F	P	F		P	F	%F
University of **Arkansas**....	87	1	3	0	91	90	1	1.1
Coll. of Med. Evan. **(Calif.)**	78	1	42	2	123	120	3	2.4
Stanford University.....	67	1	3	0	71	70	1	1.4
Univ. of California.....	144	2	1	0	147	145	2	1.4
Univ. of Southern California	69	1	0	0	70	69	1	1.4
Univ. of **Colorado**.....	71	0	8	0	79	79	0	0.0
Yale Univ. **(Connecticut)**..	18	1	72	1	92	90	2	2.2
Geo. Washington Univ. **(D.C.)**	33	3	74	2	112	107	5	4.5
Georgetown University.....	61	8	45	1	115	106	9	7.8
Howard University.....	104	8	8	0	120	112	8	6.7
Emory Univ. **(Georgia)**....	92	10	1	0	103	93	10	9.7
University of Georgia.....	94	6	0	0	100	94	6	6.0
Loyola Univ. **(Illinois)**....	138	5	6	0	149	144	5	3.4
Northwestern University...	257	5	24	0	286	281	5	1.7
University of Chicago.....	105	3	4	0	112	109	3	2.7
University of Illinois.....	345	3	10	0	358	355	3	0.8
Indiana University.....	96	4	7	0	107	103	4	3.7
State University of **Iowa**...	60	4	28	0	92	88	4	4.3
University of **Kansas**.....	94	1	0	0	95	94	1	1.1
Univ. of Louisville **(Ky.)**..	181	3	11	0	195	192	3	1.5
Louisiana State University.	78	1	1	0	80	79	1	1.2
Tulane University.....	165	2	7	1	175	172	3	1.7
Johns Hopkins Univ. **(Md.)**	82	4	14	1	101	96	5	5.0
University of Maryland....	119	2	8	0	129	127	2	1.6
Boston Univ. **(Mass.)**.....	22	0	68	0	90	90	0	0.0
Harvard Medical School...	95	4	145	0	244	240	4	1.6
Tufts College Med. School..	25	2	138	1	166	163	3	1.8
University of **Michigan**....	159	3	6	1	169	165	4	2.4
Wayne University.....	53	0	6	0	59	59	0	0.0
University of **Minnesota**...	222	1	10	1	234	232	2	0.9
St. Louis Univ. **(Missouri)**	145	6	18	0	169	163	6	3.6
Washington University.....	116	1	5	0	122	121	1	0.8
Creighton Univ. **(Nebraska)**	65	5	9	0	79	74	5	6.3
University of Nebraska....	92	4	3	0	99	95	4	4.0
Albany Med. Coll. **(N. Y.)**	4	1	34	1	40	38	2	5.0
Columbia University.....	37	0	113	1	151	150	1	0.7
Cornell University.....	32	2	38	0	72	70	2	2.8
Long Island Coll. of Med.	45	4	63	2	114	108	6	5.3
New York Medical College	13	6	93	2	114	106	8	7.0
New York University.....	59	0	97	0	165	156	9	5.5
Syracuse University.....	22	6	28	0	56	50	6	10.7
University of Buffalo.....	5	1	77	0	83	82	1	1.2
University of Rochester....	33	4	42	0	79	75	4	5.1
Duke University **(North Carolina)**	31	3	78	0	112	109	3	2.7
Bowman Gray School of Med.	45	0	4	0	49	49	0	0.0
Ohio State University.....	90	3	0	0	93	90	3	3.2
University of Cincinnati...	91	3	3	0	97	94	3	3.1
Western Reserve University	93	3	1	0	97	94	3	3.1
University of **Oklahoma**...	76	0	0	0	76	76	0	0.0
University of **Oregon**.....	94	0	4	0	98	98	0	0.0
Hahnemann, Phila. **(Pa.)**..	169	12	9	0	190	178	12	6.3
Jefferson Medical College..	162	4	14	1	181	176	5	2.8
Temple University.....	154	5	4	0	163	158	5	3.0
University of Pennsylvania.	151	3	20	1	175	171	4	2.3
University of Pittsburgh...	90	2	3	0	95	93	2	2.1
Woman's Med. College.....	24	0	1	0	25	25	0	0.0
Med. Coll. of **South Carolina**	47	1	0	0	48	47	1	2.1
Meharry Med. Coll. **(Tenn.)**	53	4	12	2	71	65	6	8.5
University of Tennessee...	123	5	1	0	129	124	5	3.9
Vanderbilt University.....	54	1	7	0	62	61	1	1.6
Baylor University **(Texas)**.	53	1	0	0	54	53	1	1.9
Southwestern Medical Coll.	33	0	0	0	33	33	0	0.0
University of Texas.....	93	0	0	0	93	93	0	0.0
University of **Utah**.....	70	0	2	0	72	72	0	0.0
University of **Vermont**.....	14	0	25	0	39	39	0	0.0
Med. Coll. of **Virginia**.....	140	3	2	0	145	142	3	2.1
University of Virginia.....	82	1	2	0	85	84	1	1.2
Marquette Univ. **(Wisconsin)**	77	6	14	0	97	91	6	6.2
University of Wisconsin...	89	0	1	0	90	90	0	0.0
Subtotals: U. S. Schools	6,090	198	1,567	21	7,876	7,657	219	2.8
Dalhousie Univ. **(N. S.)**...	10	2	1	0	13	11	2	15.4
Laval Univ. **(Quebec)**.....	12	6	0	0	18	12	6	33.3
McGill University.....	44	4	29	0	77	73	4	5.2
Queen's Univ. **(Ontario)**...	7	0	0	0	7	7	0	0.0
University of **Alberta**.....	3	0	1	0	4	4	0	0.0
University of **Manitoba**....	10	0	1	0	11	11	0	0.0
Univ. of Montreal **(Quebec)**	5	3	1	0	9	6	3	33.3
Univ. of Toronto **(Ontario)**	20	1	1	0	22	21	1	4.5
Univ. of Western Ontario..	7	1	0	0	8	7	1	12.5
Subtotals: Canadian Schools	118	17	34	0	169	152	17	10.1
Extinct Medical Schools...	63	5	3	0	71	66	5	7.0
Unapproved Schools.....	362	258	0	0	620	362	258	41.6
Foreign Medical Faculties..	220	274	7	0	501	227	274	54.7
Totals 6,853		752	1,611	21	9,237	8,464	773	8.4

reduced because of the high percentage of failures before state boards by unapproved and foreign graduates. Sixty approved schools in the United States and 6 in Canada were represented in the National Board examinations.

FAILURES

Data recorded in table 7 refer to failures before medical licensing boards by licentiates of 1946. The United States is divided into two groups—the thirty states and the District of Columbia in which approved four year medical schools are located and those states and territories and possessions which have no medical school within their boundaries. Included is the number who failed state board examinations and were graduates of a medical school located in the state in which they were examined and, for comparison, the number of graduates licensed in a given state who obtained their professional training in schools in other states.

TABLE 7.—*Licensure Failures by Graduates of Approved Schools Located in the State Where Examined and Elsewhere*

States with Medical Schools	Total No. Examined	No. Failures of Schools in State	No. Schools in State Represented at Examinations	Per Cent Failed	No. Failures of Schools Out of State	No. Schools Out of State Represented at Examinations	Per Cent Failed	Per Cent Failed in All U. S. Schools
Arkansas	63	0	1	0.0	0	12	0.0	0.0
California	503	2	4	0.4	3	43	0.6	1.0
Colorado	67	0	1	0.0	0	11	0.0	0.0
Connecticut	45	1	1	2.2	1	24	2.2	4.4
Dist. of Columbia	39	0	3	0.0	0	4	0.0	0.0
Georgia	162	0	2	0.0	2	19	1.2	1.2
Illinois	685	3	4	0.4	3	43	0.4	0.9
Indiana	97	2	1	2.1	0	8	0.0	2.1
Iowa	58	3	1	5.2	0	1	0.0	5.2
Kansas	102	0	1	0.0	0	18	0.0	0.0
Kentucky	163	0	1	0.0	0	6	0.0	0.0
Louisiana	188	1	2	0.5	0	10	0.0	0.5
Maryland	194	0	2	0.0	0	17	0.0	0.0
Massachusetts	61	1	3	1.6	9	24	14.8	16.4
Michigan	213	0	2	0.0	0	21	0.0	0.0
Minnesota	236	0	1	0.0	0	37	0.0	0.0
Missouri	242	0	2	0.0	1	21	0.4	0.4
Nebraska	82	3	2	3.7	0	0	0.0	3.7
New York	268	27	9	10.1	57	36	21.3	31.3
North Carolina	92	0	2	0.0	0	16	0.0	0.0
Ohio	283	3	3	1.1	0	18	0.0	1.1
Oklahoma	68	0	1	0.0	0	0	0.0	0.0
Oregon	52	0	1	0.0	2	7	3.8	3.8
Pennsylvania	457	1	6	0.2	2	21	0.4	0.7
South Carolina	53	0	1	0.0	0	12	0.0	0.0
Tennessee	157	1	3	0.6	0	4	0.0	0.6
Texas	214	1	3	0.5	1	24	0.5	0.9
Utah	78	0	1	0.0	0	10	0.0	0.0
Vermont	5	0	1	0.0	0	0	0.0	0.0
Virginia	161	0	2	0.0	0	2	0.0	0.0
Wisconsin	122	0	2	0.0	1	13	0.8	0.8
Subtotals	5,270	49	69	0.9	82	472	1.6	2.5
States Without Medical Schools								
Alabama	19	.....			0	11	0.0	0.0
Arizona	13	.....			1	9	7.7	7.7
Delaware	16	.....			0	8	0.0	0.0
Florida	414	.....			59	57	14.3	14.3
Idaho	48	.....			0	24	0.0	0.0
Maine	28	.....			0	12	0.0	0.0
Mississippi	41	.....			0	13	0.0	0.0
Montana	15	.....			0	12	0.0	0.0
Nevada	16	.....			3	14	18.7	18.7
New Hampshire	15	.....			1	8	6.7	6.7
New Jersey	93	.....			1	24	1.1	1.1
New Mexico	1	.....			0	1	0.0	0.0
North Dakota	11	.....			0	7	0.0	0.0
Rhode Island	34	.....			0	18	0.0	0.0
South Dakota	10	.....			0	6	0.0	0.0
Washington	117	.....			0	32	0.0	0.0
West Virginia	62	.....			0	21	0.0	0.0
Wyoming	0	.....			0	0	0.0	0.0
Alaska, Hawaii and Puerto Rico	65	.....			2	29	3.1	3.1
Subtotals	1,018	.....			67	306	6.2	6.2

Practically all states require the applicant to receive a general average of 75 per cent and at least 50 per cent in any one subject. In case of failure in not more than two subjects the applicant is entitled to another examination in those subjects within twelve months. A few states consider such individuals as conditioned in the subjects in which they fail and do not report them to the office of the Council on Medical Education and Hospitals as failures. In these instances they are not considered in the calculations in this study. When their grades are raised after a successful test in the subjects in which they failed they are recorded among those who passed.

Forty-nine physicians failed examinations in the state in which they obtained their professional training. This occurred in eleven states. Twenty-seven failed in New York State. Eleven states also reported 82 failures among students who graduated from approved medical schools located in states other than the one in which they were examined. Again, New York reported the greatest number, 57. Massachusetts reported 1 failure from its own schools and nine from twenty-four other schools, 14.8 per cent. Eighteen states reported no failures during the year from graduates of schools located in these states, and twenty states had no failures among graduates of schools in other states. Fourteen states had no failures in either group.

In eighteen states having no medical schools, only five reported failures. A total of 67 failed, of which 59 were in Florida. In this state a written examination is required of every one for licensure, and no reciprocal or endorsement provisions have been established.

The total examined in the first group, states in which approved medical schools are located, was 5,270, while in the second group, states which have no approved school within their boundary, 1,018 were examined.

In table 8 the data are further subdivided by the number of candidates who were licensed after previous failures. The figures are presented for three categories —approved medical schools in the United States and Canada, foreign faculties of medicine and unapproved institutions. These groups are classified according to the number licensed after failing a state board examination once and after two or more failures and indicates whether the single and multiple failures have been in the state where licensed or elsewhere. The total number of candidates in 1946 examined and licensed or granted licenses by reciprocity or endorsement of credentials is shown and the total number of failures in all groups is indicated.

In 1946 there were 16,129 licenses to practice medicine issued. Of these 656 had previously been unsuccessful before a licensing board. From the approved schools 417 had previously failed a state board examination. One hundred and sixty had one failure in their state of licensure and 169 were licensed after one failure in another state. Eighty-eight received licenses after more than one failure, 31 of whom had previously failed in the state where licensed, 47 failed elsewhere and 10 failed in the state where licensed and elsewhere.

One hundred and sixty-four graduates of foreign faculties of medicine and 75 graduates of unapproved institutions were licensed after previous failure.

In the computation of these statistics multiple failures by graduates of unapproved schools and of foreign faculties of medicine reveal the difficulty these individuals experience in passing licensure tests. Eleven failed five times and 33 more than five times before obtaining a license. Of the foreign graduates, 11 had five failures before obtaining a license, 8 failed six times, 5 seven, 3 eight, 3 nine and 1 each failed twelve, fifteen

and sixteen tests. The 11 graduates of unapproved institutions failed as follows: five tests, 3; six tests, 4; seven tests, 2, and eight tests, 2. The majority of these physicians with multiple failures were Massachusetts and New York examinees.

In six states all physicians licensed last year had no failure in a state medical examination before being registered. With fourteen exceptions, the number of physicians licensed throughout the country in each state after previously having failed was less than 10.

amended in 1946 to permit the granting of certificates without examination by endorsement of a license from another state. Massachusetts prior to 1946 had no such reciprocal relations but did license without examination diplomates of the National Board of Medical Examiners. In 1946 also Rhode Island established reciprocal relations with four states. Idaho will endorse diplomates of the National Board of Medical Examiners. There remains only one state which requires a written examination of all applicants for licensure—Florida. Those

TABLE 8.—*Failures Before Medical Licensing Boards by Licentiates, 1946*

	Licenses Issued by Examination, Reciprocity or Endorsement	Approved Schools					Foreign Schools					Unapproved Schools					Total Failures by Licentiates, 1946
		Licensed After One Failure		Licensed After Two or More Failures			Licensed After One Failure		Licensed After Two or More Failures			Licensed After One Failure		Licensed After Two or More Failures			
		Failed in State Where Licensed	Elsewhere	Failed in State Where Licensed	Elsewhere	Failed in State Where Licensed and Elsewhere	Failed in State Where Licensed	Elsewhere	Failed in State Where Licensed	Elsewhere	Failed in State Where Licensed and Elsewhere	Failed in State Where Licensed	Elsewhere	Failed in State Where Licensed	Elsewhere	Failed in State Where Licensed and Elsewhere	
Alabama	179	..	1	..	1	1	..	..	..	..	..	..	..	..	..	..	3
Arizona	100	..	2	..	1	1	..	..	..	..	..	..	1	..	..	..	4
Arkansas	112	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	2
California	2,045	40	22	7	6	1	4	7	..	4	3	..	4	..	..	..	94
Colorado	235	..	5	..	..	..	..	1	..	..	..	..	..	..	..	..	6
Connecticut	318	..	1	..	3	..	..	4	..	2	..	..	..	..	..	..	10
Delaware	31	..	1	..	..	..	..	..	..	1	..	..	..	..	..	..	2
District of Columbia	333	1	9	..	1	..	..	..	..	5	..	..	..	..	..	..	16
Florida	318	32	6	2	..	2	..	..	..	..	..	..	..	..	..	..	42
Georgia	291	..	1	..	..	1	..	..	..	..	..	..	..	..	..	..	2
Idaho	56	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
Illinois	1,631	10	7	1	2	1	2	1	3	..	2	1	..	..	..	..	30
Indiana	250	..	4	..	1	..	..	..	..	..	..	..	..	..	..	..	5
Iowa	274	..	3	..	1	..	..	1	..	1	..	..	..	..	..	..	6
Kansas	232	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
Kentucky	182	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	2
Louisiana	283	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Maine	91	1	3	..	..	..	..	..	..	1	..	..	..	..	..	..	5
Maryland	343	1	8	..	1	..	1	..	..	..	..	..	..	..	..	..	11
Massachusetts	434	4	..	2	..	..	1	1	..	1	..	5	..	6	..	..	20
Michigan	508	..	7	..	5	..	..	..	..	..	..	..	..	..	..	..	12
Minnesota	380	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
Mississippi	134	..	3	..	..	..	..	..	..	..	..	..	..	..	2	..	5
Missouri	473	..	3	..	..	..	..	1	..	..	..	..	..	..	..	..	4
Montana	74	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Nebraska	135	5	1	1	..	..	1	1	..	..	..	..	..	..	..	..	9
Nevada	53	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	2
New Hampshire	124	..	4	..	1	..	..	..	..	1	..	..	..	..	..	..	6
New Jersey	541	..	10	..	2	..	..	13	1	14	3	..	..	..	..	..	43
New Mexico	59	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1
New York	1,513	40	7	18	1	1	24	3	31	..	2	12	6	..	8	8	161
North Carolina	286	..	1	..	2	..	..	..	..	..	..	..	..	..	..	..	3
North Dakota	30	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1
Ohio	680	4	9	..	2	..	..	4	..	6	1	5	1	4	2	..	38
Oklahoma	188	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	2
Oregon	201	..	1	..	..	..	..	..	..	..	..	..	1	..	..	..	2
Pennsylvania	718	16	6	..	2	2	..	..	..	..	..	..	..	..	..	..	28
Rhode Island	67	..	2	..	1	..	1	1	..	..	..	..	..	..	..	..	5
South Carolina	109	..	2	..	2	..	..	..	..	..	..	..	..	..	..	..	4
South Dakota	46	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
Tennessee	280	..	3	..	1	..	..	..	..	..	..	..	..	..	..	..	4
Texas	779	3	14	..	5	..	..	4	..	..	1	2	..	3	..	..	32
Utah	81	..	2	..	..	1	..	..	..	..	..	..	..	..	..	..	3
Vermont	78	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
Virginia	403	1	4	..	2	..	..	..	..	..	..	1	..	..	7	..	15
Washington	294	..	3	..	1	..	..	..	..	..	..	..	..	..	..	..	4
West Virginia	164	..	4	..	..	..	..	..	..	..	..	..	..	..	..	..	4
Wisconsin	364	..	4	..	..	..	..	..	..	..	..	..	..	..	..	..	4
Wyoming	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
U. S. Territories and Possessions	101	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	2
Totals	16,129	160	169	31	47	10	36	43	36	37	12	26	9	13	19	8	656

REGISTRATION BY RECIPROCITY AND ENDORSEMENT

A summary of the reciprocity and endorsement policies of the medical licensing boards of the various states, the District of Columbia, Alaska, Hawaii and Puerto Rico will be found in table 9. Florida, Idaho and Hawaii have not established reciprocal agreements with regard to medical licensure. Nevada has temporarily suspended reciprocity with all boards, including the National Board of Medical Examiners, by action of the Board of Medical Examiners Aug. 5, 1946, but the state reports that such agreements will probably be restored in the near future. In Massachusetts the medical practice act was

desiring licenses by reciprocity or endorsement in sixteen states, the District of Columbia and Alaska are required to obtain a certificate from the state board of examiners in the basic sciences before being eligible for licensure.

Twenty-six states and Alaska reciprocate with specifically indicated states.

Twenty-eight states and Puerto Rico, including eight which have specific reciprocity agreements, are given discretionary powers under the medical practice act. These states will register physicians who present credentials which correspond with those required by their

respective states at the time such licenses are issued. The states in which diplomates of the National Board of Medical Examiners are accepted for licensure on the basis of these credentials are also indicated.

Specific requirements, such as professional practice, oral examination and internship, are recorded, as is also the fee for a license without written examination. Citizenship prerequisites are mentioned. In some states physicians of Canadian birth are exempt from the citizenship requirement. This is indicated in footnotes. Few states will accept graduates of foreign faculties of medicine on a reciprocal basis. Additional requisites or exemptions are included in footnotes.

This chart is available in reprint form. It has proved to be of material assistance to physicians contemplating locating in another state. The facts recorded in this table are intended to be merely a summary of licensure policies. A physician using this chart for reciprocity purposes should supplement the information contained therein by direct communication with the secretary of the licensing board of the state in which he is interested.

Table 10 records the numbers from individual schools represented by the 9,570 reciprocity licentiates. Every approved medical school in the United States and Canada, with the exception of the Medical College of Alabama, whose first graduating class in 1946 did not

TABLE 9.—*Reciprocity and Endorsement*

Marginal Number	The Examining Board of	Reciprocates with, or Endorses Certificates Granted by: Alabama	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	Dist. of Columbia	Florida	Georgia	Idaho	Illinois	Indiana	Iowa	Kansas	Kentucky	Louisiana	Maine	Maryland	Massachusetts	Michigan	Minnesota	Mississippi	Missouri	Montana	Nebraska	Nevada	New Hampshire	New Jersey	New Mexico	Marginal Number
1	Alabama	...	..	+	+	+	..	+	+	..	+	..	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	..	+	+	1
2	Arizona	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2
3	Arkansas (regular board)	+	+	..	+	+	..	..	+	..	+	..	+	+	+	+	+	+	+	+	+	+	+	+	+	..	+	+	..	+	+	3
4	California	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4
5	Colorado	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5
6	Connecticut (reg. & homeo. bds.)	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6
7	Delaware (regular board)	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	7
8	District of Columbia	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	8
9	Florida	No reciprocity or endorsement policies											..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	9
10	Georgia	+	..	+	+	+	..	..	+	..	..	..	..	+	+	+	+	+	+	+	..	+	+	+	+	..	+	+	+	+	+	10
11	Idaho	No reciprocal relations											..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	11
12	Illinois	+	..	+	+	+	..	..	..	..	..	..	..	+	+	+	+	+	+	+	..	+	..	+	+	..	+	+	..	+	..	12
13	Indiana	+	..	+	+	+	..	..	+	..	+	..	[22]	..	+	+	+	+	+	+	..	+	..	+	+	..	+	+	+	+	+	13
14	Iowa	+	..	+	+	+	..	+	+	..	+	..	+	+	..	+	+	+	+	+	..	+	..	+	+	+	+	+	+	+	+	14
15	Kansas	+	+	+[19]	+	..	+	+	+	..	+	..	+	+	+	..	+	+	+	+	..	+	..	+	+	+	+	+	+	+	+	15
16	Kentucky	+	..	+	+	+	..	+	+	..	+	..	+	+	+	+	..	+	+	+	..	+	+	+	+	+	+	+	+	+	+	16
17	Louisiana (reg. & homeo. bds.)	+	+	+	+	+	+	+	+	..	+	..	+	+	+	+	+	..	+	+	+	+	+	+	+	+	..	+	+	+	+	17
18	Maine	..	..	+	+	+	..	+	+	..	+	..	+	+	+	+	+	+	..	+	..	+	+	..	+	+	+	+	+	..	+	+	18
19	Maryland (reg. & homeo. bds.)	+	..	+	+	..	..	..	+	..	+	..	+	+	+	+	+	+	+	..	..	+	+	+	+	+	+	+	+	+	+	19
20	Massachusetts	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	20
21	Michigan	+	+	+	+	+	+	+	+	..	+	..	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	21
22	Minnesota	+	+	+	+	+	+	+	..	..	+	..	..	..	+	..	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	22
23	Mississippi	+	+	+	+	+	+	+	+	..	+	..	+	+	+	+	+	+	+	+	..	+	+	+	..	+	+	+	+	+	+	23
24	Missouri	+	+	+	+	+	+	+	+	..	+	..	+	+	+	+	+	+	+	+	+	+	+	+	+	..	+	+	..	+	+	24
25	Montana	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	25
26	Nebraska	+	+	+	+	+	+	+	+	..	+	..	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	26
27	Nevada [25]	..	..	+[21]	+	+	..	..	..	..	+	..	+	+	+	+	+	+	+	+	..	+	+	+	..	+	+	..	+	..	..	27
28	New Hampshire	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	28
29	New Jersey	+	..	..	+	+	..	..	+	..	+	..	+	+	+	+	+	+	+	+	..	+	+	..	..	..	+	..	+	..	..	29
30	New Mexico	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	30
31	New York	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	31
32	North Carolina	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	32
33	North Dakota	+	..	+	+	+	..	..	..	..	+	..	+	+	+	+	+	+	..	..	..	+	..	..	+	+	+	+	+	+	+	+	33
34	Ohio	+	+	+	+	+	+	+	+	..	+	..	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	+	34
35	Oklahoma	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	35
36	Oregon	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	36
37	Pennsylvania	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	37
38	Rhode Island	..	..	..	..	..	+[16]	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+[16]	..	..	..	..	..	..	+[16]	..	..	38
39	South Carolina	+	..	..	..	..	..	..	+	..	+	..	..	..	..	+	+	+	+	+	..	+	..	..	..	..	+	..	+	+	..	39
40	South Dakota	+	+	+	+	+	..	..	+	..	+	..	+	+	+	+	+	+	..	..	+	+	+	+	..	+	+	..	+	+	+	40
41	Tennessee	+	+	+	+	+	+	+	+	..	+	..	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	..	+	+	+	41
42	Texas	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	42
43	Utah	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	43
44	Vermont	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	44
45	Virginia	+	..	+	+	..	+	+	..	..	+	..	..	+	+	+	+	+	+	..	..	+	+	+	..	+	..	..	+	+	+	+	45
46	Washington	+	..	..	+	+	..	..	..	..	+	..	..	..	+	..	+	+	..	+	..	+	+	+	+	+	+	..	..	..	..	..	46
47	West Virginia	+	..	+	..	..	..	+	+	..	+	..	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	..	+	..	47
48	Wisconsin	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	48
49	Wyoming	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	49
50	Alaska	+	..	+	+	+	..	..	..	..	..	..	..	+	..	+	+	..	..	+	..	+	+	..	+	..	..	+	+	+	..	50
51	Hawaii	No reciprocal relations											..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	51
52	Puerto Rico	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	52

This summary should be supplemented by direct communication with the

Some states have additional requirements for graduates of schools outside the United States and Canada.

+, indicates reciprocal or endorsement relationships have been established; .. indicates no reciprocal or endorsement relationships have been established. (See column—"At the discretion of the board.")

1. 1st P, first papers required; ⊕, in citizenship column indicates full citizenship required.
2. In most cases there is a small additional recording or registration fee.
3. 1st state of original license grants similar privileges.
4. Internship accepted in lieu of one year's practice.
5. Professional practice required.
6. All applicants must be graduates of a medical school approved by the American Medical Association.
7. Just preceding application.
8. No basic science reciprocity—examination must be within the state.
9. Basic science certificate required either by reciprocity or examination in addition to basic science subjects of National Board.
10. Canadian citizens are required to file first papers.
11. Leading medical schools of Great Britain recognized.
12. Oral examination required when original license is ten or more years old.
13. Applicant must have resided in the state used as basis of application for one year after date on said certificate.
14. Oral examination required.
15. Unless in practice in another state for five years.
16. Actual practice for a period of three years immediately preceding date of application.
17. Practical, clinical examination required.
18. Foreign graduates only.
19. Regular and Homeopathic boards.
20. Licentiates of Florida, Idaho, Massachusetts, Rhode Island and Hawaii not eligible for license by reciprocity.
21. Regular board.
22. Fee same as applicant's state charges if more than $50.

appear for licensure in any state, had graduates licensed without examination in 1946. More than 300 graduates of two schools were so registered from the University of Illinois and Harvard Medical School. There were more than 200 graduates of nine schools who sought such licensure. The distribution of these figures on the table reflects the movement of physicians to states other than the one in which they obtained their professional training.

One hundred and eighty-three graduates of foreign medical schools obtained endorsement of state licenses in twenty-one states and Puerto Rico, and 252 graduates of thirty schools no longer in operation were registered in forty-one states. The majority of the 252 graduates represented Rush Medical College. This school withdrew from the field of undergraduate medical education a few years ago.

Fifty graduates of schools not included on the Council's list of approved schools were licensed in thirteen states. This number included 43 osteopaths and 7 others.

The credentials presented by physicians granted licenses in 1946 to practice medicine without written examinations are given in table 11. There were 9,570 so registered on the basis of licenses issued by other states, the District of Columbia, the territories or pos-

Policies of Medical Licensing Boards

Marginal Number	Reciprocates with, or Endorses Certificates Granted by: New York	North Carolina	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina	South Dakota	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin	Wyoming	Alaska	Puerto Rico	At the Discretion of the Board	National Board of Medical Examiners	Requirements: Basic Science Certificate	Internship	Professional Practice	Citizenship [1]	Fees, Dollars [2]	Miscellaneous	Marginal Number
1	+	+	+	+	+	+	+	..	+	+	+	+	..	+	+	+	+	+	+	+	..	+[3]	+	..	⊕	1[4]	⊕[44]	50	..	1
2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	⊕[6]	..	3[4,7]	⊕	100	42	2
3	+	+	+	+	..	+	+	+	+	+	+	+	..	+	+	..	+	+	+	+	..	..	+[9]	⊕	..	1[4]	⊕	50[22]	42	3
4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+[12,43]	..	41	1[13]	⊕[45]	100	43	4
5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+[9]	⊕	..	1[4]	1st P	50	42	5
6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+[30]	+[27]	⊕[13]	..	3[16]	1st P	50	..	6
7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+[5]	..	⊕	2	⊕	100	..	7
8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+[3]	+[27]	⊕	⊕	1	..	50	..	8
9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	9
10	..	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	+	..	..	..	..	+	..	..	..	0	⊕	50	..	10
11	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+[14]	..	⊕	..	⊕	50	..	11
12	..	+	+	+	+	+	..	..	..	+	+	+	+	+	+	..	+	+	+	+	..	..	+[17]	..	..	⊕	1	1st P	25	17.45	12
13	+	+	+	+	+	+	..	..	+	+	+	+	+	+	+	..	+	+	+	+	..	..	+	..	..	..	1[4]	..	50	..	13
14	..	+	+	+	+	..	+	..	..	+	+	..	+	..	+	+	+	+	+	..	..	..	+	..	⊕	⊕	1[4]	⊕[44]	50	..	14
15	..	+	+	+	+	..	+	..	..	+	+	+	+	+	+	..	+	+	+	+	..	..	+	..	..	..	1[4,7]	⊕	25	42	15
16	..	..	..	+	+	..	+	..	+	+	+	+	+	+	+	+	+	+	..	..	..	..	+	..	..	..	1[4]	⊕	50	42	16
17	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	+	..	..	..	..	..	..	22	1[4]	1st P[40,10]	50[22]	42	17
18	..	..	+	+	+	+	+	..	+	..	+	+	+	+	+	..	+	+	+	..	..	..	+[14]	..	⊕[18]	..	1[4]	⊕[44]	52	..	18
19	+	+	..	+	+	+	+	..	+	..	+	+	..	+	+	..	+	+	..	+	..	..	+	..	..	..	1[4]	1st P	50	42	19
20	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	..	..	0	1st P	50[28]	..	20
21	..	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	+	+	..	..	..	+[38]	⊕[37]	⊕	1[4]	⊕	55	34	21
22	+	+	..	+	+	+	+	..	..	+	+	..	+	+	+	+	+	+	+	+	..	+	+	+	⊕	..	0	⊕[44]	75	17.42	22
23	..	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	+	+	..	..	+	+	..	..	..	⊕[44]	50	42.44	23
24	+	+	+	+	+	+	+	..	..	..	+	+	+	+	+	+	+	+	+	..	..	+	+	+[39]	..	⊕[33]	1[4]	⊕[44]	50	..	24
25	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	..	..	⊕	1[4]	⊕	75	44	25
26	+	+	+	..	+	+	+	..	+	..	+	+	+	+	+	+	+	+	..	+	..	..	..	+[36]	⊕	..	1[4]	⊕	50	..	26
27	+	..	..	+	+	+	+	..	..	+	+	..	+	+	+	+	+	+	..	+	..	..	..	+	..	⊕	1[4]	1st P	100	14.42	27
28	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	..	⊕	0	⊕[44]	20	..	28
29	+	..	+	+	+	+	..	..	..	..	+	+	+	+	+	..	+	+	..	..	..	..	+	+	..	⊕	0	⊕	100	..	29
30	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	⊕	..	1[4]	1st P	50	42	30
31	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	..	..	2	1st P	25	..	31
32	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	..	..	0	..	50	42.6	32
33	..	+	..	+	+	+	+	..	..	+	..	+	+	+	+	+	+	+	+	+	..	..	+	+	..	⊕	1	⊕	50[22]	14.42	33
34	..	+	+	..	+	+	+	..	+	+	+	+	+	+	+	+	+	+	+	+	..	..	+	+	..	⊕	1[4]	⊕	50	22	34
35	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	⊕	⊕	1[4]	⊕	100	42.44.6	35
36	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+[30]	+[9,27]	⊕	⊕	1[4]	⊕	100	42.4	36
37	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	..	⊕	2[24]	1st P	100	42	37
38	..	..	..	..	..	..	..	..	..	..	..	..	..	+[14]	..	..	..	..	..	..	..	..	+[14]	+[14]	⊕	⊕	0	1st P	20	..	38
39	..	+	..	+	+	+	+	..	..	+	+	..	+	+	+	+	+	+	+	..	..	..	..	+	..	..	1[4]	⊕	50	42	39
40	..	+	+	+	+	+	..	..	+	..	+	..	+	+	+	+	+	+	+	..	..	..	..	+	⊕	⊕	1	1st P	50	42	40
41	+	+	..	+	+	..	+	..	+	+	..	+	+	..	+	+	+	+	+	..	..	..	..	+[39]	⊕	..	0	⊕	100	42	41
42	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	..	..	..	0	⊕	50	..	42
43	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	..	⊕	31	⊕	50	42	43
44	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+[3]	+[28]	..	⊕	0	⊕	50	..	44
45	+	+	..	+	+	..	+	..	+	+	+	+	..	+	..	+	+	+	+	..	..	..	+	+	..	⊕[18]	22[6]	⊕[44]	50	..	45
46	..	..	..	+	+	+	..	..	+	+	..	+	+	+	..	..	+	..	+	..	..	..	+[3]	+[3]	⊕[4]	⊕	0	1st P	25	42	46
47	..	+	+	+	+	..	+	..	+	+	+	+	+	+	+	..	..	+	+	+	..	..	..	+	..	⊕	0	⊕	100	42	47
48	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	..	+	..	..	+[14]	..	..	⊕	⊕	1[29]	⊕	50[22]	42	48
49	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+[14]	+[14]	..	⊕	⊕	0	⊕	50	..	49
50	..	+	+	+	+	+	..	..	..	..	+	+	+	+	+	+	+	+	..	..	..	..	+	+	⊕	⊕	0	⊕	100	6	50
51	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	..	⊕	..	⊕	25	42.6	51
52	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+[3]	+	..	⊕	1[3]	⊕	25	..	52

secretary of the licensing board of the state in which the physician is interested.

23. Oral examination required if applicant's state requires it.
24. If the applicant passes the examination in the state from which he transfers after the completion of his internship, no practice is required.
25. Reciprocity with all states, including National Board of Medical Examiners, temporarily suspended.
26. Internship accepted—considered equivalent to two years' practice.
27. Fee $25.
28. Fee for license on basis of National Board certificate, $25.
29. A two year internship is accepted.
30. Diplomates of National Board not required to have been in practice for three years.
31. Same as required of Utah candidates applying for licensure.
32. Clinical examination required.
33. Reciprocity applicants only.
34. Supplemental examination required in certain cases when accepting the examination of a state with whom reciprocal relations have not been established.
35. May be licensed after a special (written) supplemental examination.
36. Fee for license on basis of National Board certificate, $50.
37. For matriculants after Oct. 15, 1937.
38. Fee, $20.
39. Fee, $15.
40. Permanent license withheld until completion of citizenship.
41. Graduates of foreign medical schools effective Sept. 15, 1935. Canadian schools exempted effective Sept. 19, 1939.
42. Graduates of foreign medical schools are not accepted.
43. Graduates of foreign medical schools must have fulfilled all requirements of California prior to admittance to examination for any certificate used as basis of application to California.
44. Not applicable to citizens of Canada.
45. Not required if country in which applicant is licensed will admit to practice citizens of the United States licensed to practice in some state or upon proof of requirements similar to those required by California of graduates of foreign medical schools.

TABLE 10.—*Candidates Licensed by*

Marginal Number	SCHOOL	1 Alabama	2 Arizona	3 Arkansas	4 California	5 Colorado	6 Connecticut	7 Delaware	8 Dist. Columbia	9 Florida	10 Georgia	11 Idaho	12 Illinois	13 Indiana	14 Iowa	15 Kansas	16 Kentucky	17 Louisiana	18 Maine	19 Maryland	20 Massachusetts	Marginal Number
	ARKANSAS																					
1	University of Arkansas School of Medicine	4	2	..	7	2	2	..	..	..	3	..	1	2	..	2	..	4	..	1	..	1
	CALIFORNIA																					
2	College of Medical Evangelists	..	1	..	44	6	2	..	8	..	..	..	..	..	1	2	1	1	..	10	5	2
3	Stanford University School of Medicine	1	1	..	16	..	1	..	..	..	..	..	..	..	1	..	..	..	..	1	1	3
4	University of California Medical School	..	1	..	3	1	..	..	1	..	..	..	..	1	..	..	..	..	..	1	..	4
5	University of Southern California School of Med.	..	..	..	11	..	..	..	1	..	..	..	1	..	..	..	..	..	..	..	..	5
	COLORADO																					
6	University of Colorado School of Medicine	..	..	..	24	5	2	..	..	..	..	..	2	..	3	4	..	..	..	..	..	6
	CONNECTICUT																					
7	Yale University School of Medicine	..	2	..	13	..	38	..	2	..	2	..	5	..	..	4	2	..	4	..	21	7
	DISTRICT OF COLUMBIA																					
8	George Washington University School of Medicine	1	2	..	10	..	1	..	54	..	..	1	6	..	..	3	1	..	2	21	4	8
9	Georgetown University College of Medicine	1	1	1	8	1	6	..	30	..	1	..	1	..	2	1	1	..	3	11	7	9
10	Howard University College of Medicine	..	1	1	11	..	2	..	19	..	..	..	..	2	..	1	..	2	..	2	..	10
	GEORGIA																					
11	Emory University School of Medicine	14	1	1	8	..	..	..	1	..	2	..	..	..	..	..	1	2	1	..	..	11
12	University of Georgia School of Medicine	3	..	..	7	..	..	..	3	..	..	..	..	..	..	..	..	3	1	..	1	12
	ILLINOIS																					
13	Loyola University School of Medicine	..	1	..	34	1	..	..	4	..	..	..	11	3	3	6	2	1	..	..	..	13
14	Northwestern University Medical School	2	9	..	72	16	..	1	2	..	..	..	29	5	9	5	2	1	..	4	2	14
15	University of Chicago, The School of Medicine	..	..	..	19	..	..	..	4	..	2	..	14	1	1	3	..	..	..	1	..	15
16	University of Illinois College of Medicine	2	5	1	119	6	1	..	2	..	1	..	25	11	4	4	4	4	..	1	1	16
	INDIANA																					
17	Indiana University School of Medicine	..	..	1	29	2	1	1	3	..	5	..	8	1	4	1	5	..	..	3	..	17
	IOWA																					
18	State University of Iowa College of Medicine	..	1	1	30	8	..	..	2	..	..	..	11	1	17	4	1	..	..	..	..	18
	KANSAS																					
19	University of Kansas School of Medicine	..	1	1	36	3	..	..	1	..	..	..	7	1	6	..	2	..	..	3	..	19
	KENTUCKY																					
20	University of Louisville School of Medicine	6	1	1	22	..	1	..	1	..	4	1	3	11	2	1	5	..	..	1	..	20
	LOUISIANA																					
21	Louisiana State University School of Medicine	6	..	2	9	..	1	..	1	..	1	..	1	..	..	1	..	2	..	2	..	21
22	Tulane University of Louisiana School of Medicine	27	1	3	20	2	3	..	2	..	10	..	4	..	1	2	2	12	..	..	1	22
	MARYLAND																					
23	Johns Hopkins University School of Medicine	2	..	2	27	1	9	..	12	..	6	..	5	1	..	..	1	2	2	4	3	23
24	University of Maryland School of Medicine and College of Physicians and Surgeons	..	..	1	18	1	4	1	13	..	4	..	5	..	..	1	1	2	1	6	2	24
	MASSACHUSETTS																					
25	Boston University School of Medicine	..	1	..	11	..	10	..	..	..	..	..	..	2	1	..	..	..	9	2	66	25
26	Harvard Medical School	1	2	1	42	8	11	..	10	..	3	..	15	1	1	1	1	1	2	3	65	26
27	Tufts College Medical School	2	2	..	18	..	25	..	2	..	..	..	1	1	..	..	1	..	10	..	137	27
	MICHIGAN																					
28	University of Michigan Medical School	3	4	..	53	9	..	..	2	..	1	..	13	3	4	2	4	3	..	4	..	28
29	Wayne University College of Medicine	..	1	..	38	..	2	..	..	..	1	..	3	1	1	..	..	1	..	1	..	29
	MINNESOTA																					
30	University of Minnesota Medical School	..	3	2	56	4	3	..	5	..	..	..	4	..	1	1	1	1	..	2	..	30
	MISSOURI																					
31	St. Louis University School of Medicine	1	3	2	33	4	2	..	3	..	3	..	27	7	6	6	1	3	..	1	..	31
32	Washington University School of Medicine	11	..	..	35	6	2	..	5	..	3	..	23	5	4	14	..	2	..	1	1	32
	NEBRASKA																					
33	Creighton University School of Medicine	..	1	..	21	9	1	..	1	..	..	..	4	..	7	2	..	1	..	2	1	33
34	University of Nebraska College of Medicine	1	4	2	52	13	1	..	1	..	1	..	5	3	14	7	2	4	..	..	..	34
	NEW YORK																					
35	Albany Medical College	..	..	..	5	..	4	..	1	..	..	..	1	1	..	..	1	..	..	2	5	35
36	Columbia University College of Phys. and Surgeons	2	1	2	23	3	9	1	3	..	..	..	1	..	..	..	..	..	..	8	8	36
37	Cornell University Medical College	1	2	1	19	1	10	..	3	..	2	..	..	..	..	..	1	1	..	3	3	37
38	Long Island College of Medicine	2	3	..	23	1	14	..	3	..	1	..	..	..	..	..	..	..	..	5	2	38
39	New York Med. Coll., Flower and Fifth Ave. Hosps.	1	1	1	19	..	11	..	2	..	1	..	1	..	..	2	..	1	..	2	4	39
40	New York University College of Medicine	3	1	1	44	1	10	..	2	..	1	..	2	..	1	3	..	1	..	3	5	40
41	Syracuse University College of Medicine	..	..	..	5	..	5	..	2	..	..	..	1	..	1	..	..	1	..	..	3	41
42	University of Buffalo School of Medicine	..	..	..	14	..	1	..	2	..	3	..	..	..	1	..	..	..	..	2	2	42
43	Univ. of Rochester School of Med. and Dentistry	..	1	..	9	3	2	1	1	..	..	..	3	..	..	..	..	1	4	1	43	
	NORTH CAROLINA																					
44	Bowman Gray School of Med. of Wake Forest Coll.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	44
45	Duke University School of Medicine	4	1	..	10	..	1	..	1	..	5	..	2	..	1	..	1	..	..	1	3	45
	OHIO																					
46	Ohio State University College of Medicine	1	..	..	23	..	2	..	..	..	..	..	8	2	1	2	2	2	1	2	..	46
47	University of Cincinnati College of Medicine	3	1	..	38	3	6	..	..	..	2	..	5	2	2	..	10	2	..	2	..	47
48	Western Reserve University School of Medicine	..	1	1	19	2	1	..	2	..	3	..	2	3	1	..	..	..	..	1	..	48
	OKLAHOMA																					
49	University of Oklahoma School of Medicine	1	1	..	16	7	..	..	1	..	1	..	6	..	2	7	1	..	..	2	..	49
	Marginal Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	

Reciprocity and Endorsement, 1946

Marginal Number	21 Michigan	22 Minnesota	23 Mississippi	24 Missouri	25 Montana	26 Nebraska	27 Nevada	28 New Hampshire	29 New Jersey	30 New Mexico	31 New York	32 North Carolina	33 North Dakota	34 Ohio	35 Oklahoma	36 Oregon	37 Pennsylvania	38 Rhode Island	39 South Carolina	40 South Dakota	41 Tennessee	42 Texas	43 Utah	44 Vermont	45 Virginia	46 Washington	47 West Virginia	48 Wisconsin	49 Wyoming	50 Alaska, Hawaii, Puerto Rico and Virgin Islands	Totals	Marginal Number
1	5	1	2	9	..	1	..	..	6	2	1	1	..	2	7	1	..	..	..	..	2	1	..	..	2	..	1	1	1	..	74	1
2	6	2	1	2	3	3	..	..	..	..	5	1	..	3	5	6	..	1	..	..	9	8	1	..	4	12	..	2	..	4	150	2
3	2	1	..	..	..	..	1	..	..	..	3	..	..	1	..	..	..	..	..	..	1	..	2	..	..	..	..	..	1	..	34	3
4	1	..	..	..	..	1	1	..	1	..	5	..	..	..	..	1	..	..	..	..	..	..	..	..	..	2	..	2	1	..	23	4
5	..	1	..	1	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	1	1	..	1	..	..	..	..	..	20	5
6	2	1	..	4	..	1	1	..	1	4	4	..	..	4	3	3	..	..	..	..	1	5	2	..	1	..	..	..	3	..	80	6
7	1	4	..	2	..	1	1	4	6	..	18	2	..	4	..	3	4	5	..	..	..	4	1	1	1	2	1	..	..	1	159	7
8	2	2	..	2	..	..	1	1	8	..	10	3	..	6	..	..	4	..	..	..	..	3	4	..	26	1	1	3	1	..	184	8
9	5	3	1	1	1	..	1	..	9	..	27	1	..	4	2	..	1	1	1	..	1	3	..	..	14	1	..	1	..	..	153	9
10	5	..	..	2	..	..	..	..	10	..	6	..	..	12	..	..	4	..	..	..	..	1	..	..	13	..	1	..	..	..	95	10
11	3	..	1	1	..	..	..	..	..	..	..	5	..	1	..	..	1	..	2	..	6	3	..	..	5	..	2	2	..	..	63	11
12	..	..	..	..	..	..	..	..	..	..	..	2	..	..	1	1	..	..	7	..	1	2	..	..	2	..	..	..	..	..	34	12
13	6	..	..	1	1	2	..	1	3	..	2	1	..	7	1	1	1	..	1	..	1	12	2	..	..	..	1	9	1	1	123	13
14	12	10	1	4	8	3	1	1	4	..	4	4	2	4	5	8	4	..	1	4	3	18	8	..	1	4	1	9	..	..	283	14
15	2	..	..	1	1	..	..	..	1	..	3	..	1	2	..	..	..	..	..	2	..	4	4	..	2	4	..	7	..	..	79	15
16	13	1	1	6	2	4	2	..	..	5	4	2	1	6	3	5	1	..	..	..	2	29	..	..	2	3	1	20	1	..	305	16
17	15	..	2	1	..	..	..	..	2	..	8	2	2	7	4	1	5	..	..	..	1	13	1	1	..	1	4	6	..	..	140	17
18	15	4	..	5	..	1	..	..	2	2	7	1	3	2	3	4	2	..	..	2	1	15	1	..	2	7	..	7	2	..	164	18
19	4	..	..	45	..	2	..	1	3	..	1	3	..	8	6	6	..	..	..	..	1	13	..	..	..	4	1	4	..	..	163	19
20	8	1	1	7	..	2	2	..	2	..	11	2	1	26	5	1	3	..	2	..	4	21	8	..	6	6	5	6	1	..	191	20
21	1	1	7	4	..	..	..	1	..	..	12	3	..	..	..	..	..	..	2	..	..	17	..	..	2	1	..	1	1	..	79	21
22	1	6	11	5	1	..	..	1	11	1	9	7	..	..	4	..	2	..	2	..	8	45	..	..	2	2	..	3	1	1	213	22
23	5	1	2	3	1	..	1	2	9	2	28	6	..	5	..	..	10	..	3	..	8	9	3	..	6	3	1	..	..	..	185	23
24	5	3	1	..	1	..	2	3	9	1	26	6	..	2	1	..	8	..	1	..	..	2	..	1	13	..	8	1	..	1	155	24
25	1	1	..	..	..	..	..	10	1	..	17	1	..	1	..	1	2	5	..	..	..	2	2	..	..	2	..	..	..	5	153	25
26	7	4	3	2	1	2	1	14	7	3	31	3	..	15	2	3	13	4	1	1	4	8	1	6	1	4	..	4	..	..	313	26
27	2	2	..	4	..	..	..	16	4	1	22	1	1	9	..	..	8	4	..	..	2	4	..	4	1	..	..	..	..	..	284	27
28	5	3	..	5	1	2	1	..	5	2	15	2	1	20	2	3	4	..	1	..	4	8	..	..	3	4	..	10	..	..	204	28
29	1	1	..	..	1	..	..	..	1	1	3	..	..	3	1	1	..	..	..	..	1	1	..	..	1	1	1	..	..	..	67	29
30	12	8	1	3	5	1	..	1	1	..	8	..	..	8	..	7	1	..	..	5	..	7	1	..	..	5	1	17	3	..	178	30
31	10	2	..	7	6	..	..	..	7	3	16	..	..	34	6	3	7	..	..	1	2	9	2	..	..	11	3	5	..	1	237	31
32	7	2	..	1	1	..	..	..	1	2	8	3	1	7	3	3	3	..	..	1	3	13	3	..	2	9	6	5	3	1	200	32
33	4	2	..	12	4	10	1	2	2	..	8	1	..	6	3	6	..	..	..	11	..	7	..	..	..	4	..	1	5	..	139	33
34	11	11	1	7	1	3	1	..	1	..	6	2	..	5	3	5	3	..	..	3	2	13	1	..	3	5	1	6	5	1	210	34
35	..	..	..	..	..	..	..	2	6	..	38	..	..	2	..	1	1	..	..	..	1	1	..	2	..	..	..	..	1	..	75	35
36	4	1	1	2	2	..	3	9	19	1	59	1	..	5	1	..	7	..	..	..	..	6	..	2	3	2	2	3	1	1	196	36
37	..	..	..	..	1	..	..	3	15	..	31	..	..	4	..	1	8	..	..	..	4	1	..	2	3	2	..	2	..	..	124	37
38	5	2	..	..	..	..	1	1	24	..	58	1	..	6	..	1	8	1	..	..	2	..	..	2	5	..	..	..	..	..	171	38
39	1	..	..	..	..	1	2	..	22	..	127	4	..	2	..	1	6	..	1	..	..	3	..	1	2	1	1	..	..	..	221	39
40	5	1	..	2	..	1	2	4	48	2	77	2	..	8	..	..	6	..	..	..	3	12	..	1	3	1	..	1	1	1	250	40
41	2	2	..	1	..	..	1	..	2	..	21	..	..	2	..	..	2	..	..	..	2	1	1	..	..	1	..	1	..	..	57	41
42	7	2	..	..	..	..	..	2	1	..	100	..	..	8	..	..	1	1	..	..	..	..	..	..	..	..	..	3	..	1	151	42
43	1	..	1	3	..	..	..	2	2	..	27	..	..	3	..	4	3	..	..	..	1	3	1	1	..	2	..	1	..	..	81	43
44	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	1	..	..	1	..	..	1	..	..	..	..	..	5	44
45	6	3	..	..	..	..	..	2	8	..	11	31	..	5	1	2	4	1	7	..	1	4	..	1	8	..	6	..	..	..	131	45
46	8	1	..	1	1	..	2	..	1	..	2	2	..	..	..	2	2	..	1	..	2	13	..	..	4	..	..	3	..	..	91	46
47	9	..	..	..	..	..	..	..	3	1	1	..	..	3	..	1	3	..	1	..	..	10	..	..	3	..	3	3	..	..	117	47
48	11	2	1	3	1	1	..	1	2	1	2	3	1	..	2	1	2	..	..	..	1	3	1	..	4	4	2	2	..	..	87	48
49	4	3	2	2	..	1	..	..	2	3	..	1	..	1	3	4	..	..	..	..	2	14	..	..	..	2	..	2	..	..	91	49
	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50		

TABLE 10.—*Candidates Licensed by Reciprocity*

Marginal Number	SCHOOL	1 Alabama	2 Arizona	3 Arkansas	4 California	5 Colorado	6 Connecticut	7 Delaware	8 Dist. Columbia	9 Florida	10 Georgia	11 Idaho	12 Illinois	13 Indiana	14 Iowa	15 Kansas	16 Kentucky	17 Louisiana	18 Maine	19 Maryland	20 Massachusetts	Marginal Number
	OREGON																					
50	University of Oregon Medical School	..	..	..	17	2	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	50
	PENNSYLVANIA																					
51	Hahnemann Med. Coll. and Hosp. of Philadelphia	4	..	..	13	1	2	1	2	..	1	..	..	3	..	1	..	1	..	1	..	51
52	Jefferson Medical College of Philadelphia	3	1	1	28	1	4	..	4	..	3	1	5	4	4	1	1	2	..	6	2	52
53	Temple University School of Medicine	1	1	..	16	2	1	1	3	..	1	..	..	..	3	..	..	2	1	4	..	53
54	University of Pennsylvania School of Medicine	1	1	..	16	2	3	1	3	..	5	..	10	..	3	7	2	1	1	7	5	54
55	University of Pittsburgh School of Medicine	2	..	..	20	1	..	..	4	..	..	..	3	1	..	..	2	..	1	..	..	55
56	Woman's Medical College of Pennsylvania	..	..	..	4	..	..	..	..	..	..	..	1	..	..	..	1	..	1	..	..	56
	SOUTH CAROLINA																					
57	Medical College of the State of South Carolina	..	..	..	2	..	1	..	..	..	5	..	1	..	..	..	..	1	..	..	..	57
	TENNESSEE																					
58	Meharry Medical College	2	..	1	26	1	2	..	3	..	11	..	3	5	..	1	..	5	..	..	..	58
59	University of Tennessee College of Medicine	13	..	11	21	2	2	1	1	..	4	..	4	..	1	3	14	7	..	2	..	59
60	Vanderbilt University School of Medicine	5	2	1	5	1	1	..	1	..	5	..	2	..	..	3	13	3	..	1	..	60
	TEXAS																					
61	Baylor University College of Medicine	1	3	1	9	3	2	..	1	..	3	..	1	..	1	1	..	3	..	..	..	61
62	Southwestern Medical College of the Southwestern Medical Foundation	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	62
63	University of Texas School of Medicine	2	1	2	8	4	..	..	1	..	..	..	1	..	..	4	2	6	..	..	..	63
	UTAH																					
64	University of Utah School of Medicine	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	64
	VERMONT																					
65	University of Vermont College of Medicine	..	..	..	6	..	9	..	1	..	1	..	..	..	..	..	..	..	1	2	7	65
	VIRGINIA																					
66	Medical College of Virginia	2	1	..	4	..	1	..	5	..	3	..	..	..	..	1	2	2	..	1	..	66
67	University of Virginia Department of Medicine	2	..	1	8	1	1	1	10	..	7	..	..	2	..	..	1	1	1	7	..	67
	WISCONSIN																					
68	Marquette University School of Medicine	..	..	..	26	4	..	..	2	..	..	..	5	..	2	..	..	..	..	2	..	68
69	University of Wisconsin Medical School	..	3	1	18	3	1	..	4	..	..	..	5	2	3	..	..	..	..	..	..	69
	CANADA																					
70	Dalhousie University Faculty of Medicine	..	..	..	2	..	2	..	1	..	..	..	..	..	..	..	..	..	..	..	..	70
71	Laval University Faculty of Medicine	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	71
72	McGill University Faculty of Medicine	..	..	1	13	1	7	..	4	..	..	..	1	..	..	3	..	..	..	1	5	72
73	Queen's University Faculty of Medicine	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	73
74	University of Alberta Faculty of Medicine	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	74
75	University of Manitoba Faculty of Medicine	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	75
76	University of Montreal Faculty of Medicine	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	76
77	University of Toronto Faculty of Medicine	..	1	..	10	..	1	..	..	..	..	..	..	..	..	1	..	..	..	..	..	77
78	University of Western Ontario Faculty of Medicine	..	..	..	3	..	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..	78
	OTHERS																					
79	Foreign Medical Faculties	..	..	..	30	..	18	1	14	..	..	..	..	1	6	..	..	..	1	2	..	79
80	Extinct Medical Schools	4	6	..	73	..	3	..	5	..	3	..	11	13	..	5	1	..	2	1	..	80
81	Unapproved Schools	..	2	..	..	..	..	4	1	..	..	..	1	7	1	..	..	..	..	..	..	81
82	Totals	148	88	49	1,606	158	269	15	289	0	124	3	320	111	128	123	98	94	46	162	374	82
	Marginal Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	

session or foreign countries, the certificate of the National Board of Medical Examiners or one of the government services.

The 9,570 licensed by this method exceeded those so licensed in any previous year. The year which nearest approximates the 1946 figure was 1945, when 3,615 physicians were licensed in this way. The number securing licenses by reciprocity or endorsement has been steadily increasing but not to the extent which was evident in 1946. The return of medical officers to private practice in states other than those in which they were located before entering military service would appear to account for the 1946 increase. The almost universal recognition of former state licenses on the part of the medical licensing boards of the United States, permitting physician veterans to resume practice soon after separation from service, is highly commendable.

California issued 1,606 licenses by this method, and New York issued 1,081. Six other states endorsed 300 or more candidates, namely Illinois 320, Massachusetts 374, Michigan 318, New Jersey 425, Ohio 390 and Texas 513. In every state there was an increase over the number licensed in 1945. In many instances the increase was more than tripled, indicating an improved distribution of physicians. The largest number of candidates presenting the same type of credentials were the 2,654 diplomates of the National Board of Medical Examiners. On the basis of the National Board certificate 754 were certified in New York, 374 in Massachusetts and 247 in California.

More than 600 presented licenses issued in Illinois and New York. The greatest number licensed in any one state presenting a like state license were 225 Illinois licentiates who secured licenses in California. Other states registered 166 holding California licenses, while that state licensed on credentials 1,606 physicians from

and Endorsement, 1946—Continued

Marginal Number	21 Michigan	22 Minnesota	23 Mississippi	24 Missouri	25 Montana	26 Nebraska	27 Nevada	28 New Hampshire	29 New Jersey	30 New Mexico	31 New York	32 North Carolina	33 North Dakota	34 Ohio	35 Oklahoma	36 Oregon	37 Pennsylvania	38 Rhode Island	39 South Carolina	40 South Dakota	41 Tennessee	42 Texas	43 Utah	44 Vermont	45 Virginia	46 Washington	47 West Virginia	48 Wisconsin	49 Wyoming	50 Alaska, Hawaii, Puerto Rico and Virgin Islands	Totals	Marginal Number
50	1	1	..	1	1	1	..	..	..	..	2	1	..	1	..	25	2	..	..	..	..	1	1	..	..	17	..	3	..	..	79	50
51	8	..	..	1	..	..	1	1	21	..	11	1	..	9	2	..	28	..	1	..	2	5	..	..	7	2	2	1	..	2	132	51
52	3	1	..	1	..	..	..	1	11	3	17	5	..	10	3	1	23	..	3	..	3	4	..	2	5	1	4	2	..	2	175	52
53	1	1	1	4	1	..	1	..	9	..	13	5	..	6	..	..	13	..	1	2	2	7	..	1	2	..	1	2	..	3	112	53
54	1	3	3	4	1	1	1	3	13	1	21	4	1	13	3	3	23	..	2	..	3	8	4	5	10	8	2	3	..	..	210	54
55	3	..	1	..	..	1	..	1	5	..	8	..	..	6	..	..	9	..	..	..	2	4	..	1	5	4	1	..	..	..	78	55
56	2	..	2	..	..	..	..	..	2	..	5	..	..	3	..	..	2	1	..	..	..	..	..	..	1	..	..	2	..	..	27	56
57	..	..	1	1	..	..	..	..	..	..	2	11	..	4	..	..	2	..	1	..	1	1	..	..	5	..	1	1	..	..	41	57
58	15	..	6	19	..	..	..	..	7	..	7	11	..	8	2	..	4	..	5	..	2	13	..	..	8	..	2	..	..	..	109	58
59	2	..	15	12	..	1	1	..	1	1	2	6	..	2	7	..	..	..	..	1	5	29	1	..	2	1	3	..	..	..	178	59
60	3	..	7	4	2	..	..	..	1	..	1	6	..	7	2	..	..	..	3	..	3	19	..	..	7	1	1	..	..	..	110	60
61	2	..	1	2	..	..	..	..	..	4	3	1	..	2	3	2	2	..	..	..	1	3	1	..	3	..	..	2	1	..	62	61
62	..	..	..	..	..	..	..	..	..	1	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	62
63	6	1	2	3	..	..	..	..	..	2	2	..	..	2	2	1	..	..	1	..	..	..	1	..	..	1	..	2	..	..	57	63
64	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	2	64
65	..	1	..	..	..	..	..	5	4	..	20	1	..	..	..	..	2	..	..	..	..	1	..	26	..	..	2	..	..	..	89	65
66	2	3	1	1	1	..	..	..	2	1	13	12	..	5	1	..	3	..	2	..	4	5	..	..	5	..	16	1	..	1	101	66
67	3	1	..	1	..	..	1	1	4	..	12	6	1	2	..	..	3	..	1	..	7	3	..	1	1	2	7	1	..	..	101	67
68	7	4	..	..	2	1	..	..	3	..	8	..	..	2	1	1	2	..	1	..	..	..	..	..	3	4	..	15	1	..	96	68
69	3	6	..	1	1	..	..	..	..	1	4	..	..	3	1	3	1	..	..	..	..	6	..	..	3	2	..	28	..	..	103	69
70	..	..	..	..	..	..	..	..	6	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	..	..	..	13	70
71	1	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	71
72	1	1	1	..	..	..	..	3	4	1	9	5	..	..	..	1	..	..	..	..	..	2	..	1	1	4	1	2	..	..	73	72
73	..	..	..	..	..	..	..	..	1	..	3	..	..	1	..	..	..	..	..	..	..	3	..	..	..	..	..	..	..	..	8	73
74	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	74
75	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	1	..	..	..	6	75
76	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	2	76
77	4	..	1	1	..	..	..	..	..	..	8	2	..	4	1	2	..	..	..	..	..	2	..	..	..	1	..	1	..	..	40	77
78	1	..	..	1	..	..	..	..	..	..	4	..	..	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	13	78
79	2	..	1	1	..	1	..	3	53	2	18	..	..	18	..	..	..	..	..	..	..	5	..	1	3	..	..	1	..	1	183	79
80	14	3	5	4	3	5	4	1	4	4	4	4	1	11	3	4	2	1	..	3	3	16	1	1	5	3	1	10	2	3	252	80
81	..	..	..	..	..	1	..	..	..	..	..	..	..	7	..	12	..	..	..	..	..	1	..	..	1	..	..	11	1	..	50	81
82	318	121	89	223	57	55	38	101	425	58	1,081	191	17	390	109	148	258	25	56	36	125	513	61	64	220	164	100	241	38	31	9,570	82
	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50		

other states. California held reciprocity meetings in almost every month in 1946 to speed the issuance of licenses. In contrast with California, 614 licentiates of Illinois were licensed in other states while it endorsed 320 physicians. No physician holding a New Mexico license applied for registration in another state during the year; only one physician from Idaho did so. Florida, with no reciprocity or endorsement policies, was the only state which required every one of its 1946 licentiates to pass a written examination.

One physician was admitted to private practice in the Virgin Islands on presentation of satisfactory credentials. One hundred and eighty-eight medical officers of one of the government services received licenses without written examination or by endorsement in nine states: California 71, Illinois 15, New Mexico 3, Pennsylvania 4, Texas 12, Utah 5, Virginia 3, Wisconsin 74 and Wyoming 1.

Forty physicians who were legal residents of Pennsylvania and were qualified to take the state board examination but were prevented from doing so by their service in the armed forces were licensed without examination in Pennsylvania under the provisions of Act No. 132, approved April 25, 1945.

Fourteen physicians were licensed in seven states on credentials from one of the possessions of the United States, and twenty-two on the basis of Canadian or foreign licenses.

Included in table 10 are 43 osteopaths licensed without examination. These occurred in Delaware, District of Columbia, Indiana, Ohio, Oregon, Wisconsin and Wyoming.

Diplomates of the National Board were registered on the basis of this credential by forty-four licensing boards in the United States and by the boards of Hawaii and Puerto Rico last year. There were 2,654 individuals who presented National Board credentials.

TABLE 11.—*Candidates Licensed by Reciprocity and Endorsement*

State Issuing License by Reciprocity or Endorsement	Total Licensed	Alabama	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	District of Columbia	Florida	Georgia	Idaho	Illinois	Indiana	Iowa	Kansas	Kentucky	Louisiana	Maine	Maryland	Massachusetts	Michigan	Minnesota	Mississippi	Missouri	Montana	Nebraska	Nevada	New Hampshire	New Jersey	New Mexico	New York	North Carolina	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina	South Dakota	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin	Wyoming	U. S. Govt. Services	National Board of Medical Examiners	U. S. Terr. and Possessions	Canadian & Foreign	Miscellaneous
Marginal Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55
Alabama	148	..	..	4	1	..	..	..	1	..	17	..	6	1	..	..	5	28	..	3	..	5	1	6	11	..	1	..	..	..	..	3	2	..	5	1	1	4	..	..	..	19	3	..	..	5	..	..	..	..	15	..	..	..
Arizona	88	..	..	2	3	1	2	..	..	..	1	..	16	..	2	..	1	1	..	1	2	3	4	..	4	1	4	..	..	1	..	7	..	..	2	2	..	2	..	..	2	2	4	..	1	2	..	1	3	..	..	11	..	..	..
Arkansas	49	..	..	..	..	..	..	..	..	..	1	..	1	1	1	2	1	4	..	1	..	..	4	2	2	..	2	..	..	1	..	4	1	..	2	..	..	..	..	..	..	11	3	..	..	1	..	..	1	..	..	4	..	..	..
California	1,606	1	5	4	..	18	4	..	1	5	16	1	225	32	24	43	19	30	3	35	6	97	71	1	54	1	50	2	..	14	..	132	6	5	99	14	13	84	3	1	5	43	16	3	2	16	25	7	51	..	71	247	1	..	..
Colorado	158	..	..	2	2	..	..	..	2	..	..	..	17	1	7	3	..	2	1	1	..	11	6	..	9	..	20	..	..	..	..	9	..	..	5	8	2	4	..	..	..	5	9	..	..	1	1	..	6	..	..	24	..	..	..
Connecticut	269	..	..	2	3	1	..	..	..	..	..	..	4	1	1	..	..	3	3	11	5	3	4	1	2	..	..	1	2	..	56	2	..	10	..	..	..	9	1	..	..	4	1	..	4	3	..	1	2	..	..	129	..	..	..
Delaware	15	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	2	..	2	..	..	..	..	..	8	..	..	..	..	..	..	..	..	..	1	2	..	..	106	2	1	..
Dist. Columbia	289	..	..	..	7	1	2	..	..	..	5	..	9	4	2	3	1	2	1	37	..	4	..	..	7	1	2	..	1	8	..	22	3	..	8	1	..	14	..	..	1	6	2	..	..	..	..	..	..	..	..	..	20	1	..	..
Florida	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	2	..	7	1	..	3	..	5	..	19	3	..	1	10	1	1	1	..	..	3	..	..	..
Georgia	124	5	..	3	..	..	..	..	..	..	..	..	..	5	..	1	3	8	..	10	..	2	2	3	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	72	..	..	..
Idaho	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	21	4	1	15	..	..	..	9	5	1	..	1	..	1	20	1	15	..	..	..	..
Illinois	320	..	..	1	10	4	..	1	..	..	..	..	..	9	12	8	4	7	..	9	..	20	3	1	55	..	4	..	..	5	..	..	2	2	..	8	..	1	5	..	..	..	5	..	..	..	1	..	..	3	..	..	..	..	..
Indiana	111	..	..	2	3	..	1	..	..	..	1	..	30	..	1	2	11	..	..	1	..	9	..	..	18	..	4	..	..	1	..	2	..	..	5	2	..	10	..	..	..	1	2	..	..	..	1	..	5	..	..	25	..	..	..
Iowa	128	..	..	1	1	4	..	..	..	..	..	..	12	4	..	7	1	..	..	..	..	7	4	1	11	..	19	..	..	1	..	4	..	..	..	..	..	8	5	..	..	8	5	..	..	2	..	..	1	1	..	20	..	..	..
Kansas	123	..	..	2	3	..	..	..	2	..	..	..	11	1	5	..	1	7	..	..	..	4	..	..	24	..	8	..	1	1	..	..	..	..	..	..	..	4	..	..	..	3	..	..	1	..	..	10	..	..	..	10	..	..	..
Kentucky	98	1	..	1	..	..	..	..	..	1	..	..	9	5	1	2	..	3	..	1	..	4	1	3	1	..	2	..	..	..	..	1	..	..	14	1	..	6	..	..	..	26	2	..	..	3	..	..	..	..	..	..	..	..	..
Louisiana	94	4	..	4	..	..	..	..	..	..	6	..	5	..	..	..	..	..	..	6	..	4	1	12	6	..	4	..	..	1	..	2	1	..	4	..	..	1	..	..	..	13	10	..	..	3	..	..	..	..	..	28	..	..	..
Maine	46	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	1	..	4	..	..	..	..	..	..	1	..	..	3	..	..	..	..	1	..	..	3	..	..	..	..	..	..	1	..	..	1	..	..	..	..	42	..	..	..
Maryland	162	2	..	1	5	1	1	2	19	..	..	..	4	4	1	3	1	1	2	..	..	4	1	..	1	..	1	..	..	2	..	26	3	..	5	2	..	13	..	1	..	2	..	..	..	8	..	4	..	..	..	374	..	..	..
Massachusetts	374	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	33	..	..	..
Michigan	318	..	..	3	9	2	1	..	1	..	3	..	34	17	16	7	6	1	1	15	1	14	..	1	15	..	12	..	..	1	..	16	1	..	35	4	..	18	..	1	..	17	9	1	1	6	5	2	9	..	..	44	..	..	..
Minnesota	121	..	..	1	5	2	..	..	..	..	2	..	..	..	6	..	1	5	..	2	..	6	..	1	4	..	12	..	..	..	..	2	..	..	3	3	..	3	..	..	1	1	..	..	1	5	2	..	9	..	..	11	..	1	..
Mississippi	89	2	..	2	..	..	..	..	2	..	1	..	2	2	..	..	1	19	..	3	..	..	1	..	..	..	1	..	..	..	..	1	..	..	4	1	..	4	..	1	..	23	3	..	..	1	..	2	..	..	..	44	..	..	..
Missouri	223	..	..	9	1	3	2	..	..	..	2	..	9	2	7	54	6	9	..	4	..	5	3	1	..	..	10	..	..	..	..	7	2	..	3	1	..	6	..	..	1	36	5	..	..	2	1	..	2	..	..	30	..	..	..
Montana	57	..	..	..	6	..	..	..	..	..	..	..	4	..	1	..	..	..	..	2	1	4	9	..	8	..	4	..	..	..	..	1	..	..	2	..	1	..	2	2	..	4	..	..	..	..	..	..	..	..	..	..	..	..	..
Nebraska	55	..	..	1	4	..	..	..	..	..	..	..	9	..	6	4	2	1	..	..	..	2	5	..	..	..	1	..	..	..	..	2	1	1	1	..	..	1	..	..	..	2	..	2	..	..	..	..	..	..	..	7	..	..	..
Nevada	38	..	..	..	5	1	..	..	..	..	..	..	4	..	..	..	2	..	1	3	..	1	..	..	..	..	1	..	..	2	..	2	..	..	..	..	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	7	..	..	..
New Hampshire	104	..	..	..	..	..	1	..	..	..	..	..	2	..	..	..	1	..	2	8	1	3	..	..	..	..	1	..	..	3	..	7	..	..	2	..	..	1	..	..	..	7	..	..	..	..	..	..	..	..	..	51	1	2	..
New Jersey	425	1	..	4	1	1	..	2	1	..	..	..	2	2	1	4	..	16	3	26	3	4	1	..	7	..	1	..	..	..	..	5	..	..	1	..	..	4	3	..	..	1	7	..	..	1	..	3	..	..	..	125	..	..	..
New Mexico	58	..	1	2	..	3	..	..	..	..	1	..	6	..	3	..	..	1	..	1	..	5	..	..	4	..	1	..	..	..	..	147	3	..	7	1	..	47	1	..	..	9	1	..	..	7	..	6	27	2	..	7	..	..	754	7	16	..
New York	1,081	1	..	..	19	3	..	2	3	..	..	..	1	10	11	..	..	22	..	49	2	24	8	..	15	..	8	..	..	4	..	..	4	..	3	..	1	65	..	..	..	..	..	..	..	1	19	..	3	..	..	..	48	..	..	..
North Carolina	191	1	..	1	1	..	..	1	1	..	6	..	7	3	1	3	2	8	..	10	1	2	..	2	4	..	1	..	..	2	..	8	1	2	11	..	12	1	26	1	..	1	19	..	3	..	..	..	..	..	..	3	..	..	..
North Dakota	17	..	..	..	..	..	..	..	..	..	..	..	5	2	2	..	1	..	..	..	..	1	..	..	..	..	..	..	..	..	..	7	..	..	1	..	..	15	4	..	..	1	..	..	..	1	..	..	..	..	..	66	..	..	..
Ohio	390	..	..	2	5	3	4	1	2	1	..	..	18	8	3	9	27	..	4	8	6	20	8	..	52	1	7	..	..	4	..	37	1	1	..	1	1	49	2	2	..	10	9	..	..	1	..	..	1	..	..	8	..	..	..
Oklahoma	109	..	..	7	6	3	..	..	1	..	1	..	14	1	11	4	1	2	..	..	..	6	14	..	11	1	6	..	..	1	..	3	1	1	6	5	..	2	..	..	1	..	4	..	1	..	1	..	3	..	..	20	..	..	..
Oregon	148	..	..	1	13	3	..	..	..	..	1	..	8	4	6	7	5	3	..	..	..	1	5	1	9	..	2	..	..	..	..	28	10	..	13	..	1	..	..	1	..	4	2	1	..	9	1	4	3	..	..	63	1	..	40
Pennsylvania	258	..	..	..	..	..	2	2	..	4	..	..	4	6	2	..	2	1	1	21	1	6	1	..	6	..	2	..	1	14	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	25	..	..	..
Rhode Island	25	..	..	..	..	..	..	..	..	..	10	..	..	..	..	..	..	2	5	..	4	..	2	..	..	..	..	..	..	..	1	..	..	7	..	2	..	..	4	..	..	..	6	1	..	..	3	..	1	1	..	..	8	..	..	..
South Carolina	56	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	2	11	..	..	..	7	..	..	..	..	..	..	..	2	1	1	..	..	..	..	..	1	..	..	..	3	..	1	1	..	..	2	..	..	..
South Dakota	36	..	..	..	..	1	..	..	..	..	..	..	..	..	5	1	..	1	..	..	..	3	2	6	8	..	1	..	..	3	..	11	4	..	7	1	..	12	..	..	..	..	1	..	..	9	..	1	..	..	..	8	..	..	..
Tennessee	125	3	..	3	5	..	..	..	..	..	6	..	8	2	1	1	4	6	..	7	2	3	2	6	8	..	1	..	..	3	..	11	4	..	7	1	..	12	..	..	..	..	1	..	..	9	..	1	..	..	10	..	12	39	..	..	..
Texas	513	4	..	..	13	..	..	1	..	..	5	..	60	12	15	16	21	49	1	14	..	8	..	13	25	..	15	..	..	1	..	40	5	1	34	18	..	17	..	2	1	56	..	..	..	4	..	..	1	10	..	39	..	..	..
Utah	61	..	..	..	7	1	..	..	..	..	..	..	4	1	1	1	8	1	..	2	..	2	..	..	5	1	5	..	..	1	..	..	..	..	1	..	..	2	..	..	..	..	2	..	..	4	..	..	2	..	5	11	..	..	..
Vermont	64	..	..	..	..	..	..	..	..	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	8	..	..	10	..	..	24	1	6	..	15	2	..	..	1	..	..	5	6	..	3	46	..	1	..
Virginia	229	2	..	2	2	1	..	..	26	..	5	..	3	..	2	..	5	3	..	21	..	6	..	1	6	..	3	..	..	2	..	18	7	..	5	1	14	11	..	..	..	2	..	2	..	2	..	..	5	..	..	41	..	1	..
Washington	164	..	..	..	16	1	..	..	..	..	2	..	2	5	..	1	5	..	..	10	..	2	2	..	11	..	1	..	..	1	..	..	1	..	1	..	..	5	..	..	..	..	..	..	..	..	..	..	..	..	..	32	1	..	..
West Virginia	100	1	..	..	..	..	..	..	..	..	..	..	2	6	5	5	5	3	..	..	..	8	12	1	23	..	4	..	..	..	..	8	1	2	6	1	2	1	..	1	1	1	5	1	..	2	21	..	..	..	..	16	..	..	..
Wisconsin	241	1	..	1	2	..	..	..	..	..	..	..	56	6	5	3	1	1	1	..	..	..	3	..	2	..	5	..	..	..	..	1	..	..	..	..	..	..	..	..	..	1	..	2	..	..	..	..	..	..	..	1	2	..	..	..
Wyoming	38	..	..	1	6	6	..	..	..	..	..	..	2	..	3	1	1	1	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Alaska, Hawaii, Puerto Rico & Virgin Islands	31	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	2	..	..	..	..	..	1	8	..	..	..	..	..	..	..	..	1	..	..	..	..	18	..	..	1
Totals	9,570	30	6	69	166	64	20	11	64	10	94	1	614	154	173	193	161	249	30	330	44	319	204	59	448	5	232	3	4	86	0	624	73	13	367	86	42	492	8	37	16	401	128	15	29	215	56	40	165	2	188	2,654	14	22	41
Marginal Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55

Source of Former License or Credentials

LICENTIATES REPRESENTING ADDITIONS TO THE MEDICAL PROFESSION

Licentiates of 1946 who received their first license to practice medicine and surgery during the year and therefore represent additions to the medical profession in the United States and its territories and possessions are recorded in table 12. The figures in this compilation represent candidates examined in 1946 and licensed, some who were examined in the previous year but whose licenses were withheld pending completion of a required internship, citizenship and other technicalities, and those without a state license who were during the year certified on the basis of the examinations of the National Board of Medical Examiners, government services or Canadian and foreign credentials.

TABLE 12.—*Licentiates Representing Additions to the Medical Profession, 1946*

	Examination	Reciprocity and Endorsement	Total
Alabama	24	9	33
Arizona	3	0	3
Arkansas	63	1	64
California	395	75	470
Colorado	72	8	80
Connecticut	34	80	114
Delaware	13	0	13
District of Columbia	24	42	66
Florida	57	0	57
Georgia	151	11	162
Idaho	14	3	17
Illinois	579	56	635
Indiana	135	0	135
Iowa	89	14	103
Kansas	96	12	108
Kentucky	81	4	85
Louisiana	182	0	182
Maine	33	12	45
Maryland	179	12	191
Massachusetts	40	304	344
Michigan	271	16	287
Minnesota	182	29	211
Mississippi	43	3	46
Missouri	242	13	255
Montana	10	0	10
Nebraska	77	4	81
Nevada	5	3	8
New Hampshire	19	27	46
New Jersey	107	75	182
New Mexico	1	5	6
New York	273	495	768
North Carolina	95	28	123
North Dakota	6	1	7
Ohio	287	42	329
Oklahoma	79	0	79
Oregon	45	5	50
Pennsylvania	435	75	510
Rhode Island	21	8	29
South Carolina	51	7	58
South Dakota	4	1	5
Tennessee	154	0	154
Texas	233	22	255
Utah	12	6	18
Vermont	13	29	42
Virginia	167	9	176
Washington	77	9	86
West Virginia	36	6	42
Wisconsin	100	35	135
Wyoming	0	2	2
Alaska, Canal Zone, Hawaii, Puerto Rico, Virgin Islands	46	6	52
Totals	5,355	1,604	6,959

There were 6,959 additions to the medical profession in 1946. By reference to table 1 it can be noted that 16,129 licenses were issued during the year, indicating that 9,170 had previously been licensed. The number of physicians removed by death in the United States, possessions and territories, and those physicians temporarily located in a foreign country in the same period was 3,358.[2] Thus the physician population in the United States was increased by 3,601. Actually the physician population figure is considerably higher at the present time by the return of medical officers to private practice in view of the 16,129 licenses issued, which exceeded the 1945 figure by 6,477. While these physicians cannot be considered additions to the medical profession since they were licensed prior to entry into military service, many of them may be considered to be graduates who received their training under the A. S. T. or Navy V-12 programs and entered military service on completion of a nine month internship but who obtained state licensure before doing so but were not engaged in the

TABLE 13.—*Licentiates Representing Additions to the Medical Profession Grouped in Geographic Divisions, 1946*

	Examination	Reciprocity and Endorsement	Total
New England			
Maine	33	12	45
New Hampshire	19	27	46
Vermont	13	29	42
Massachusetts	40	304	344
Rhode Island	21	8	29
Connecticut	34	80	114
	160	460	620
Middle Atlantic			
New York	273	495	768
New Jersey	107	75	182
Pennsylvania	435	75	510
	815	645	1,460
East North Central			
Ohio	287	42	329
Indiana	135	0	135
Illinois	579	56	635
Michigan	271	16	287
Wisconsin	100	35	135
	1,372	149	1,521
West North Central			
Minnesota	182	29	211
Iowa	89	14	103
Missouri	242	13	255
North Dakota	6	1	7
South Dakota	4	1	5
Nebraska	77	4	81
Kansas	96	12	108
	696	74	770
South Atlantic			
Delaware	13	0	13
Maryland	179	12	191
District of Columbia	24	42	66
Virginia	167	9	176
West Virginia	36	6	42
North Carolina	95	28	123
South Carolina	51	7	58
Georgia	151	11	162
Florida	57	0	57
	773	115	888
East South Central			
Kentucky	81	4	85
Tennessee	154	0	154
Alabama	24	9	33
Mississippi	43	3	46
	302	16	318
West South Central			
Arkansas	63	1	64
Louisiana	182	0	182
Oklahoma	79	0	79
Texas	233	22	255
	557	23	580
Mountain			
Montana	10	0	10
Idaho	14	3	17
Wyoming	0	2	2
Colorado	72	8	80
New Mexico	1	5	6
Arizona	3	0	3
Utah	12	6	18
Nevada	5	3	8
	117	27	144
Pacific			
Washington	77	9	86
Oregon	45	5	50
California	395	75	470
	517	89	606
Territories and Possessions			
Alaska	0	0	0
Hawaii	6	1	7
Puerto Rico	40	4	44
Virgin Islands	0	1	1
	46	6	52
Totals	5,355	1,604	6,959

2. J. A. M. A. **133**: 108 (Jan. 11) 1947.

private practice of medicine. The number in this group is not known, but it is probable that the effective addition to the profession is in excess of the figures shown in table 12.

Analyzing table 12, it can be noted that New York had the greatest number of first licentiates, 768. Illinois

TABLE 14.—*Licentiates Representing Additions to the Medical Profession, 1935-1946*

Year	Examination	Reciprocity and Endorsement	Total
1935	5,099	411	5,510
1936	5,548	629	6,177
1937	5,812	612	6,424
1938	5,759	501	6,260
1939	5,584	460	6,044
1940	5,432	455	5,887
1941	5,240	473	5,713
1942	5,558	454	6,012
1943	5,585	372	5,957
1944	6,490	470	6,960
1945	4,941	768	5,709
1946	5,355	1,604	6,959
Totals	66,403	7,209	73,612

was second, with 635. Two states, California and Pennsylvania, had more than 400. There were additions to the profession in every state last year. Comparison with 1945 figures shows increases in some states and decreases in others. Of the smaller states in terms of population increases over 1945 figures were noted in Idaho, Montana, Nevada, New Hampshire, New Mexico, North Dakota, Oregon and Wyoming, which suggests a measure of improvement in the distribution of physicians and likewise of medical care.

The 6,959 licentiates constituting additions to the medical profession last year represented 5,355 who secured their licenses by examination and 1,604 by endorsement of credentials. The latter were mainly diplomates of the National Board of Medical Examiners.

Increases in the physician population arranged in nine geographic divisions of the United States are shown in table 13. The East North Central and Middle Atlantic group of states added the greatest number, 1,521 and 1,460 respectively. More than 500 were added in five other groups—New England 620, West North Central 770, South Atlantic 888, West South Central 580 and Pacific 606. The East South Central states added 318, the Mountain states 144 and the territories and possessions 52. Alaska did not add a single physician to the medical profession last year in this compilation of first licenses.

In the last twelve years there were 73,612 physicians added to the profession in the United States (table 14); 66,403 were licensed after a successful written examination and 7,209 by reciprocity or endorsement. In the same period 115,503 licenses were issued, 75,293 by examination and 40,210 by endorsement of credentials. Thus 41,891 licenses were obtained in this twelve year period by physicians who had previously been licensed to practice medicine.

Estimated figures indicate that on March 15, 1947 the number of physicians in continental United States including those licensed in 1946 and those still in military service was 197,605. This figure does not represent the practicing physician manpower of the country, because many licensed physicians are engaged in such activities as research, teaching and administration. Others are retired.

LICENSURE UNDER THE ACCELERATED PROGRAM

The majority of physicians who obtained their professional training under the wartime accelerated program have thus far experienced no difficulty in obtaining licensure on that account. All states as well as the District of Columbia, Alaska, Hawaii and Puerto Rico made adjustments in their licensure legislation or practices, where these were required, to facilitate the licensure of graduates under the accelerated program. Legislation in four instances (District of Columbia, Georgia, Illinois and Minnesota) is such as might not always fully provide for students who have completed all their medical school work under the accelerated program and spend a week or two less than thirty-six months in a medical school.

PREMEDICAL TRAINING

The minimum requirement of the Council on Medical Education and Hospitals for admission to approved medical schools since 1918 has been two years of college training, and in 1938 three years was recommended. With the exception of California and Nebraska (table 15) the state licensing boards, by statute in the majority of instances, require that an applicant for licensure must present evidence of having completed two years of college. The two year requirement will become effective in Connecticut on July 1, 1947. In November 1942 the Council on Medical Education and Hospitals recommended that, for the duration of the war, premedical education, including satisfactory courses in physics, biology and inorganic and organic chemistry, be included within two calendar years. Such a program was adopted by practically all medical schools in the United States and Canada. There is a distinct trend toward the establishment of the prewar requirements. There are now sixty-seven of the eighty-seven schools requiring three or more years of premedical work.

An important problem regarding premedical requirements is posed by the many excellent educational opportunities at the high school and college level afforded men in the armed forces. The American Council on

TABLE 15.—*Requirements of Premedical Training by Medical Licensing Boards*

Two Years or More of College		
Alabama	Louisiana	Oklahoma
Alaska	Maine	Oregon
Arizona	Maryland	Pennsylvania
Arkansas	Massachusetts	Puerto Rico
Canal Zone	Michigan	Rhode Island
Colorado	Minnesota	South Carolina
Connecticut *	Mississippi	South Dakota
Delaware	Missouri	Tennessee
District of Columbia	Montana	Texas
Florida	Nevada	Utah
Georgia	New Hampshire	Vermont
Hawaii	New Jersey	Virgin Islands
Idaho	New Mexico	Virginia
Illinois	New York	Washington
Indiana	North Carolina	West Virginia
Iowa	North Dakota	Wisconsin
Kansas	Ohio	Wyoming
Kentucky		
One Year of College	High School Graduation or its Equivalent	
California	Nebraska	

* Effective July 1, 1947

Education recommends the awarding of certain high school and college credits for courses taken by members of the armed forces (*a*) by correspondence through the "Armed Forces Institute," which operates in collaboration with colleges and universities, and (*b*) in

classroom work in various schools operated for men and women in the armed services.

The American Council on Education, representing higher education in this country, has carefully evaluated the content and quality of the many courses given in both these categories. It has issued the "Guide to the Evaluation of Educational Experiences in the Armed Forces" to assist colleges desiring to do so to award proper high school and college credit for specific courses taken in this program.

In addition to awarding credit for courses actually taken, as already described, there is a program for evaluating a veteran's learning experiences while in the armed forces by administering "general educational development tests" and awarding appropriate credit at the high school and college levels on the basis of the examination results, even though formal course work in the subject matter of the examination was not taken by the candidate. These are comprehensive examinations developed by the Armed Forces Institute and sponsored by the American Council on Education.

The Council on Medical Education and Hospitals has agreed to these recommendations in principle in the following statement:

High School and College Credit for Veterans

A. Courses at the high school and college level have been offered to members of the armed forces,

1. by correspondence through the "Armed Forces Institute," which operates in collaboration with colleges and universities, and

2. in classroom work in various schools operated for men and women in the armed services.

The American Council on Education, representing higher education in this country, has carefully evaluated the content and quality of the many courses given in both these categories. It has issued the "Guide to the Evaluation of Educational Experiences in the Armed Forces" to assist colleges desiring to do so to award proper high school and college credit for specific courses taken in this program.

B. In addition to awarding credit for courses actually taken, as described in A, there is a program for evaluating a veteran's knowledge in a given field by administering "General Educational Development Tests" and awarding appropriate credit at the high school and college levels on the basis of the examination results, even though formal course work in the subject matter of the examination was not taken by the candidate. These are comprehensive examinations developed by the Armed Forces Institute and sponsored by the American Council on Education.

C. The Council on Medical Education and Hospitals of the American Medical Association (*a*) has confidence in the American Council on Education and its "Guide to the Evaluation of Educational Experiences in the Armed Forces," in the Armed Forces Institute and in the General Educational Development tests and (*b*) wishes to support sound procedures permitting veterans to commence their education in civilian institutions at a level commensurate with their ability and knowledge. Therefore the Council has decided that approved medical schools desiring to accept students at the freshman level partially on the basis of high school or college awarded credit as described in A and B will not be in conflict with the Council's regulations and policies, except that college credit for science courses requiring laboratory work should not be allowed on this basis, nor should blanket credit be allowed for military service not based on courses or examinations. Specifically, a medical college may accept, in partial fulfilment of premedical requirements:

1. High school credits, based on

(*a*) Courses taken from the Armed Forces Institute or in service courses of the armed forces according to the "Guide to the Evaluation of Educational Experiences in the Armed Forces."

(*b*) Performance in the General Educational Development Tests; such credit may include the equivalent of a complete high school course.

2. College credits (except in science courses requiring laboratory work, or except blanket credits for military services not based on courses or examinations), based on

(*a*) Courses taken from the Armed Forces Institute or in service courses of the armed forces according to the "Guide to the Evaluation of Educational Experiences in the Armed Forces."

(*b*) Performance in the General Education Development Tests.

The licensing boards of all but four states have indicated that the awarding of premedical credits under this plan by approved medical schools as the equivalent of the required premedical training will satisfy the requirement for licensure.

The Army Specialized Training and Navy V-12 premedical programs called for less than two years of college training, but in both these programs the studies were continuous and provided for the student carrying more than the normal peacetime studies per semester. Both the Army and Navy programs provided for work well in excess of the sixty semester hours constituting the normal two academic years of medical study. The information received from those states whose licensure laws include specific premedical requirements seems to indicate that there should be no licensure difficulties encountered by students whose premedical work was taken under the Army Specialized Training or Navy V-12 or comparably accelerated civilian programs.

TABLE 16.—*Medical Schools Requiring an Internship*

College of Medical Evangelists
University of Southern California School of Medicine
Stanford University School of Medicine
Northwestern University Medical School
University of Minnesota Medical School
Duke University School of Medicine
University of Alberta Faculty of Medicine
University of Manitoba Faculty of Medicine
Dalhousie University Faculty of Medicine
University of Montreal Faculty of Medicine

TABLE 17.—*Medical Licensing Boards Requiring a One Year Internship* †

Alabama	Montana	Puerto Rico
Alaska	Nevada	Rhode Island*
Canal Zone	New Hampshire	South Dakota
Delaware*	New Jersey*	Utah*
District of Columbia	New Mexico	Vermont
Hawaii*	North Dakota*	Virgin Islands
Idaho	Oklahoma	Washington*
Illinois*	Oregon	West Virginia
Iowa*	Pennsylvania*	Wisconsin*
Michigan*		Wyoming

† Some states require the internship from graduates of medical faculties abroad and from reciprocity or endorsement applicants.
* Internship must be rotating service.

REQUIRED INTERNSHIPS

The medical schools requiring an internship for the M.D. degree are shown in table 16. There are six schools in the United States and four in Canada with this requirement. There has been no change in this list in the past three years. In the academic year 1945-1946 there were 488 students of schools in the United States and 156 from Canadian schools, a total of 644, engaged in the required year of internship training or research.

Although relatively few schools require the internship for the M.D. degree, this is a requirement for licensure by twenty-three state medical licensing boards, the District of Columbia, Alaska, the Canal Zone, Hawaii Puerto Rico and the Virgin Islands (table 17). These states have returned to the prewar requirement of a one year internship but will continue to accept the nine

month wartime internship. Table 18 lists these states and indicates the relationship of their requirement to the former nine month internship. Eight states, the Connecticut homeopathic examining board, Alaska, the Canal Zone, Hawaii and Puerto Rico will accept the nine month internship as fulfilling the internship requirement. Eleven states and the District of Columbia require an additional three months in a civilian hospital or military service but will permit applicants for licensure to write the examination but withhold the license until this is completed. In four states and the Virgin Islands medical officers will be required to show completion of a year's internship, three months of which may be in military service.

The licensing boards of Delaware, Hawaii, Illinois, Iowa, Michigan, New Jersey, North Dakota, Pennsylvania, Rhode Island, Utah, Washington and Wisconsin require the internship to be a rotating service.

A few of the medical schools and licensing boards maintain their own list of hospitals acceptable for intern training, but the list of approved internships compiled by the Council on Medical Education and Hospitals of the American Medical Association is generally used.

TABLE 18.—*Relationship of the Former Nine Month Internship to Licensure*

	Additional Three Months in Civilian Hospital or Military Service Required	
Accepted as Fulfilling Internship Requirement	Will Give Examination at End of Nine Months	Will Not Give Examination Until Completion of Year's Service
Alaska	Alabama [1]	Illinois [2]
Canal Zone	Delaware	New Mexico
Connecticut (homeo. board)	Dist of Columbia [1]	Utah
Hawaii [3]	Iowa [1]	Virgin Islands
Idaho	North Dakota	West Virginia
Michigan [1]	Oregon [1]	
Montana [1]	Rhode Island [1]	
Nevada	South Dakota [1,2]	
New Hampshire	Vermont	
New Jersey	Washington [1]	
Oklahoma [1]	Wisconsin	
Pennsylvania	Wyoming	
Puerto Rico [2]		

1. Will also give examination on completion of the medical course but withhold license until internship is completed.
2. Military medical service must be in a military hospital.
3. License issued after year's residence.

LICENSURE FOR MEDICAL OFFICERS

In February 1946 [3] the Federation of State Medical Boards published a statement based on a canvass of respective licensing boards of the country on several points pertaining to the licensure of returning medical officers. The text of this report indicates that medical officers will be required to satisfy peacetime licensure regulations except in a few instances where special consideration is given to such applications. However, in several ways the medical licensing boards have attempted to be of assistance to medical officers in returning to the private practice of medicine, i. e. the issuance of temporary permits, relaxation of the one year internship requirement and the licensure of physicians by reciprocity and endorsement of credentials. At present there is only one state—Florida—which requires a written examination of all applicants for medical licensure. Reciprocity meetings have been held at more frequent intervals than previously. The advantage of this procedure is evidenced by the fact that in 1946 there were 9,570 so licensed as compared with 3,615 licensed in 1945.

3. J. A. M. A. **131**: 124 (May 11) 1946.

The medical practice acts of most states, by opinion of the attorney general in several instances, do not provide for the acceptance of government credentials as a basis for licensure without examination. The boards of four states may issue a license without examination to a physician who has passed an examination for admission to the medical corps of the U. S. Army, Navy or Public Health Service. These states are California, Illinois, Utah and Virginia. Act No. 132, approved April 25, 1945, provides for the licensure of legal residents of Pennsylvania who were qualified in every respect to take the state board examinations in Pennsylvania but were prevented from doing so by reason of enlistment or induction into the military or naval forces of the United States in World War II. In South Dakota former medical officers of World War II are exempted by law from the basic science board examination. In Wisconsin honorably discharged officers of the government services may be licensed without examination. New York and Ohio will admit graduates of unapproved medical schools to its examinations under certain conditions.

The Bureau of Information of the American Medical Association is continuing to help veteran medical officers with their medical practice and relocation problems. This is done through close association with state and county medical societies as an entirely voluntary effort without any attempt to direct the location of a physician.

An officer can obtain a brief but comprehensive picture of the economic status of any particular area he is interested in from the data contained on county summary sheets. This includes data on population, principal cities, physicians' hospital and medical facilities and pertinent economic, social and financial information. A copy of this summary sheet is forwarded to the inquirer, and a copy of the letter to him is sent to the state and county medical society concerned.

In addition to the information contained on the summary sheets, other data are available for interested officers. Requests for full or part time salaried medical positions from industries, institutions and other organizations, requests from practicing physicians for associates, needs for specialists and requests of individuals for practices are cross filed and kept current by a return post card system which keeps the Bureau of Information informed of final locations, filling of vacancies and the securing of physicians.

At its December 1945 meeting the Council on Medical Education and Hospitals of the American Medical Association passed the following resolution:

> The Council on Medical Education and Hospitals of the American Medical Association does not intend to remove any hospital from the lists of hospitals approved for internships or residencies which furnishes teaching facilities to any veteran medical officer who is eligible for educational benefits under the Servicemen's Readjustment Act, provided the veteran is legally eligible for medical licensure in the state in which the hospital is located.

This action of the Council was approved by the Federation of State Medical Boards at its meeting on Feb. 12, 1946. The American College of Surgeons is also in accord with this policy of the Council on Medical Education and Hospitals.

TEMPORARY PERMITS

The licensing boards of thirteen states, Alaska and Puerto Rico provide for the issuance of temporary permits. These states, the length of validity of the

permit and the number of permits granted during the last calendar year are shown in table 19. Nevada, North Dakota and Pennsylvania discontinued this emergency regulation in 1946, while Nebraska was added to the list. There were 809 temporary permits granted during the year as compared with 323 in 1945.

TABLE 19.—*Temporary Permits, 1945*

State	Permit Valid for:	Permits Granted
Alaska	6 months	13
Arizona	3 months	106
Florida	Next board meeting	..
Georgia	Next board meeting	90
Indiana [1]	6 months	92
Kentucky	1-5 years (limited license)	1
Louisiana	Next board meeting	94
Maine [2]	Duration of war	2
Mississippi	Next board meeting	82
New Hampshire	Varies	..
New Mexico	Next board meeting	..
Puerto Rico	Until 1950	43
Virginia	Next board meeting	86
Washington [3]	Next board meeting	182
West Virginia	Next board meeting	18
Total		809

1. Reciprocity applicants.
2. Discontinued Jan. 1, 1947.
3. Medical officers of World War II.

ANNUAL REGISTRATION

Thirty states, the District of Columbia, Alaska and Hawaii require physicians to register their licenses annually. In table 20 are listed the licensing boards which have such a requirement and the fee charged. Some of these boards require such registration whether or not physicians reside in the states.

CANDIDATES EXAMINED, 1942-1946

In table 21 are tabulated the numbers of candidates examined in the various states, territories and possessions in the five year period from 1942 to 1946 inclusive. For each year there is recorded the number who passed and failed licensing examinations. Totals for the five year period and the percentage of candidates who failed are also given.

During this five year period 35,976 examinations were given: 31,811 were successful tests and 4,165

TABLE 20.—*States Requiring Annual Registration*

	Fee		Fee		Fee
Alaska	$10	Idaho	$2	New York *	$4
Arizona	3	Indiana	5[c]	North Dakota	*
Arkansas	*	Iowa	1	Oklahoma	3
California	2	Kansas	1	Oregon	10
Colorado	[b]	Louisiana	2	Pennsylvania	1
Connecticut	2	Minnesota	2	South Dakota	5[e]
Delaware	10	Missouri *	1	Texas	2
Dist. of Columbia	2	Montana	[d]	Utah	3
Florida	1	Nebraska	1	Washington	5
Georgia	None	Nevada	2	Wisconsin	3
Hawaii	2	New Mexico	..	Wyoming	2.50

a. Residents $2, nonresidents $4.
b. Residents $2, nonresidents $10.
c. Effective July 1, 1947.
d. Residents $5, nonresidents $1.
e. Residents $5, nonresidents $2.
* Biennial registration

(11.6 per cent) failures. New York leads in the number of examinations given. In this state in the last five years 2,878 passed the licensure examination. More than 2,000 also were successful in California, Illinois and Pennsylvania. More than 1,000 were examined in seven other states and passed, namely Louisiana, Maryland, Michigan, Minnesota, Missouri, Ohio and Texas.

The highest percentage of failures (57.9) occurred in Massachusetts. This high percentage is due to the fact that, by law, the licensing board admitted to its examinations the graduates of unapproved medical schools and graduates of osteopathic schools, many of whom repeatedly fail. A recent amendment to the medical practice act established a State Approving Authority. This body has ruled that students matriculated in institutions not meeting the standards of the Authority after Jan. 1, 1941 will not be eligible to take the licensing examination.

TABLE 21.—*Candidates Examined, 1942-1946*

	1942		1943		1944		1945		1946		Totals for Five Years		
	P	F	P	F	P	F	P	F	P	F	P	F	%F
Alabama	34	0	20	0	20	0	23	0	20	0	117	0	0.0
Arizona	9	0	6	0	11	0	11	0	12	1	49	1	2.0
Arkansas	62	0	65	0	115	0	65	0	63	0	370	0	0.0
California	459	15	507	12	458	14	467	11	530	11	2,421	63	2.5
Colorado	68	3	113	3	79	3	66	0	77	0	403	9	2.9
Connecticut	59	31	62	12	34	18	31	12	55	10	241	83	25.6
Delaware	7	0	9	0	27	0	5	0	16	1	64	1	1.5
District of Columbia	27	0	42	2	26	2	20	1	41	0	156	5	3.1
Florida	110	8	129	8	130	9	198	37	373	62	940	124	11.7
Georgia	96	0	195	0	125	1	124	0	167	2	707	3	0.4
Idaho	12	1	9	1	15	0	18	0	54	0	108	2	1.8
Illinois	421	48	391	29	218	25	415	31	751	33	2,196	166	7.0
Indiana	129	0	233	0	126	0	231	0	139	16	858	16	1.8
Iowa	44	1	106	8	83	8	68	1	56	3	357	21	5.6
Kansas	99	0	86	0	179	0	101	0	102	0	567	0	0.0
Kentucky	86	0	161	1	78	0	76	0	166	0	567	1	0.2
Louisiana	175	0	228	2	255	4	208	1	189	1	1,055	8	0.8
Maine	42	6	29	3	13	3	9	3	45	4	138	19	12.1
Maryland	165	11	296	14	151	4	193	8	204	4	1,009	41	3.9
Massachusetts	201	251	257	294	162	261	124	175	89	163	833	1,144	57.9
Michigan	196	0	299	2	189	0	194	0	215	0	1,093	2	0.2
Minnesota	199	1	290	0	197	0	217	0	313	0	1,216	1	0.1
Mississippi	43	2	113	1	71	0	50	0	45	0	322	3	0.9
Missouri	182	1	421	1	207	0	258	1	250	1	1,318	4	0.3
Montana	7	1	4	0	3	0	2	0	17	0	33	1	2.9
Nebraska	77	2	155	15	81	11	74	7	80	5	467	40	7.9
Nevada	1	0	0	1	1	0	1	1	15	3	18	5	21.8
New Hampshire	3	3	5	4	9	4	6	1	20	4	43	16	27.1
New Jersey	110	10	150	11	104	11	95	9	116	5	575	46	7.4
New Mexico	0	0	1	0	0	0	0	0	1	0	2	0	0.0
New York	1,071	660	634	443	454	362	287	247	432	385	2,878	2,097	42.2
North Carolina	77	0	115	0	105	0	132	1	95	0	524	1	0.2
North Dakota	6	1	1	0	3	0	4	0	13	0	27	1	3.6
Ohio	274	6	622	22	329	25	325	13	340	10	1,890	76	3.9
Oklahoma	54	0	114	0	72	0	69	0	68	0	377	0	0.0
Oregon	45	0	52	5	11	5	19	1	50	3	177	14	7.3
Pennsylvania	456	21	475	12	853	20	426	13	463	3	2,673	69	2.5
Rhode Island	35	0	20	0	13	3	6	0	40	0	114	3	2.6
South Carolina	46	0	91	0	51	1	58	0	53	0	299	1	0.3
South Dakota	5	0	6	0	3	0	6	0	10	0	30	0	0.0
Tennessee	190	0	201	0	237	0	193	2	156	1	977	3	0.3
Texas	289	15	195	4	303	3	228	7	266	14	1,281	43	3.2
Utah	14	0	27	0	30	0	13	0	78	0	162	0	0.0
Vermont	24	1	19	0	7	0	2	0	5	0	57	1	1.7
Virginia	145	1	264	1	158	9	39	2	174	2	780	15	1.9
Washington	60	0	54	1	76	0	34	0	130	0	354	1	0.3
West Virginia	27	0	23	0	24	0	20	0	64	0	158	0	0.0
Wisconsin	124	1	179	0	74	0	96	0	123	1	596	2	0.3
Wyoming	0	0	0	0	0	0	0	0	0	0	0	0	0.0
U. S. Territories and Possessions	54	5	14	2	39	0	35	2	72	4	214	13	5.7
Total Examined	7,225		8,402		6,815		5,929		7,605		35,976		
Passed	6,119		7,488		6,009		5,342		6,853		31,811		
Failed	1,106		914		806		587		752		4,165		
Percentage Failed	15.3		10.9		11.9		9.9		9.9		11.6		

New York had a failure percentage of 42.2, occasioned in large part by the admittance to examination of a considerable number of graduates of foreign medical schools, who likewise repeatedly fail in large numbers. The number of such graduates admitted to licensure has been decreasing in the last few years. However, the recent regulation admitting certain graduates of unapproved medical schools to its licensure examination resulted in a high percentage of failures in 1946. Other high failure percentages occurred in Connecticut, Nevada and New Hampshire. On the other hand, thirty-seven states failed less than 5 per cent in the five year period. These included nine states which had no failures: Alabama, Arkansas, Kansas, New Mexico, Oklahoma, South Dakota, Utah, West Virginia and Wyoming. The percentage of failures in all states has

decreased from 15.3 in 1942 to 9.9 in 1946. The lowest percentage of failures in this five year period occurred in 1945 and 1946, when 9.9 per cent failed.

These figures represent examinations given and not individuals examined. A candidate who fails more than once in a state in a given year is counted only once, but should he also fail in a succeeding year he is counted in that year also. The same is true of successful candidates who migrate to other states. This group represents a recapitulation of the statistics computed annually and assembled for comparative purposes. It gives only a fair approximation of the number of physicians added to the profession in five years by the written examination method. Table 12, page 271, gives the corrected compilation of the number of physicians representing additions to the medical profession.

TABLE 22.—*Registration of Physicians, 1904-1946*

Year	Examined	Passed	Percentage Failed	Reciprocity or Endorsement	Total Registered
1904	7,056	5,698	19.3	1,005	6,698
1905	7,178	5,688	20.8	394	6,082
1906	8,040	6,373	20.7	1,502	7,875
1907	7,279	5,731	21.3	1,427	7,158
1908	7,775	6,089	21.7	1,284	7,373
1909	7,295	5,865	19.6	1,381	7,246
1910	7,011	5,719	18.4	1,640	7,359
1911	6,864	5,582	19.8	1,243	6,825
1912	6,880	5,467	20.5	1,273	6,740
1913	6,453	5,253	18.6	1,292	6,545
1914	5,579	4,379	21.5	1,439	5,818
1915	5,334	4,507	15.5	1,399	5,906
1916	4,878	4,151	14.9	1,353	5,504
1917	4,753	4,084	14.1	1,360	5,444
1918	3,667	3,184	13.2	1,047	4,231
1919	4,750	4,074	14.2	2,546	6,620
1920	4,796	4,062	15.3	2,558	6,620
1921	4,825	4,228	12.4	2,186	6,414
1922	4,031	3,539	12.2	2,073	5,612
1923	4,727	4,028	14.8	2,405	6,433
1924	5,392	4,756	11.8	1,923	6,679
1925	6,002	5,450	9.2	1,861	7,311
1926	5,770	5,314	7.9	1,955	7,269
1927	5,380	5,002	7.2	2,176	7,178
1928	5,458	5,090	6.7	2,228	7,318
1929	5,629	5,282	6.2	2,420	7,702
1930	5,571	5,256	5.7	2,306	7,621
1931	5,611	5,263	6.2	2,211	7,476
1932	5,675	5,247	7.6	1,885	7,132
1933	5,673	5,244	7.6	1,989	7,233
1934	6,145	5,628	8.4	2,161	7,789
1935	6,443	5,859	9.1	2,196	8,055
1936	6,917	6,223	10.0	2,775	8,998
1937	7,334	6,604	10.0	3,203	9,807
1938	7,461	6,589	11.7	2,956	9,545
1939	7,754	6,496	16.3	2,872	9,365
1940	7,926	6,291	20.7	2,865	9,156
1941	7,539	6,057	19.7	2,759	8,816
1942	7,222	6,119	15.4	2,469	8,588
1943	8,402	7,488	10.9	2,339	9,827
1944	6,814	6,008	11.9	2,594	8,602
1945	5,929	5,342	9.9	3,615	8,957
1946	7,005	6,853	9.9	9,570	16,423

REGISTRATION, 1904-1946

A tabulation of totals and percentages for forty-three years (1904-1946) is included in table 22. This compilation covers physicians registered by written examination and by reciprocity or endorsement of credentials. There is no definite trend in the numbers annually registered from 1904 to 1933, although in 1918 the number registered dropped to the all time low record of 4,231. After 1933 there was an upward trend for a time, followed by a decline during the years 1941 and 1942. The decline of more than 1,200 in 1918 was due to the sudden withdrawal of physicians and recent graduates from civilian life during World War I. By contrast in 1943 the number registered increased 1,239 over the preceding year. The increase is a result of the accelerated curriculum and the universal effort on the part of the medical leaders of the country to maintain a steady flow of physicians for both civilian and military practice. In 1943 more physicians were examined than in any previous year. A large majority of these were recent graduates who secured licenses before assuming military duties.

The number registered in 1946 was almost twice as many as were registered in 1945. Separation from service of a large number of medical officers and their return to private practice in states other than those in which they were licensed accounts in large part for this increase.

The percentage of failures gradually dropped from 19.3 in 1904, when a great many proprietary medical schools were functioning, to 5.7 in 1930. Improvements in the standards of medical education are reflected in this decrease of failures in licensing examinations. With the migration of European physicians to this country beginning in 1936 and the resultant licensure difficulties, the proportion of failures began to rise, reaching another peak of 20.7 per cent in 1940. In the last two years the number of foreign graduates and graduates of unapproved schools applying for licensure has considerably decreased.

In analyzing this table it should be remembered that the figures refer to examinations given rather than to individuals examined.

GRADUATES OF APPROVED SCHOOLS AND OTHERS REGISTERED, 1922-1946

The educational fitness of physicians registered for the practice of medicine in twenty-five years is recorded in table 23. In the computation of these figures, schools rated as class A and B by the Council on Medical Education and Hospitals of the American Medical Association since 1907 are classified as approved. In the column "Others" are included individuals who graduated prior to 1907, when the first classification of schools was made, graduates of foreign faculties of medicine, class C graduates, osteopaths given recognition by medical licensing boards and graduates of schools not approved by the Council. In 1928 the classification A, B and C by the Council was discontinued and a list of approved medical schools has since been maintained.

TABLE 23.—*Graduates of Approved Schools and Others Registered, 1922-1945*

	Graduates of Approved Schools		Others		
	Number	Per Cent of Total	Number	Per Cent of Total	Totals
1922	4,519	80.5	1,093	19.5	5,612
1923	5,196	80.8	1,237	19.2	6,433
1924	5,687	85.1	992	14.9	6,679
1925	6,314	86.4	997	13.6	7,311
1926	6,441	88.7	828	11.3	7,269
1927	6,410	89.4	768	10.6	7,178
1928	6,585	90.1	733	9.9	7,318
1929	7,003	91.0	699	9.0	7,702
1930	7,011	92.1	610	7.9	7,621
1931	6,932	92.8	544	7.2	7,476
1932	6,675	93.7	457	6.3	7,132
1933	6,774	93.7	459	6.3	7,233
1934	7,172	92.1	617	7.9	7,789
1935	7,362	91.5	693	8.5	8,055
1936	7,932	88.2	1,066	11.8	8,998
1937	8,389	85.6	1,418	14.4	9,807
1938	8,315	87.1	1,230	12.9	9,545
1939	8,067	86.2	1,298	13.8	9,365
1940	7,781	85.0	1,375	15.0	9,156
1941	7,767	88.1	1,049	11.9	8,816
1942	7,290	84.9	1,298	15.1	8,588
1943	8,639	87.8	1,188	12.2	9,827
1944	7,733	89.9	870	10.1	8,603
1945	8,227	91.9	730	8.1	8,957
1946	15,588	94.9	835	5.1	16,423
Total	185,809	89.0	23,084	11.0	208,893

There were 16,423 candidates registered in 1946, of whom 15,588 (94.9 per cent) represented graduates of approved schools and 835 (5.1 per cent) were in the second group.

In the twenty-five year period 208,893 were registered, including 185,809 approved graduates (89 per cent) and 23,084 others (11 per cent). Since 1922 the annual number of graduates of approved schools has increased well beyond 4,500, representing 80 to 90 per cent of those annually registered. Until the influx of foreign graduates in 1936, those in the second group subsequent to 1924 were fewer than 1,000. The number in this group was considerably decreased in 1945, but in 1946 there were 105 more registered than in the preceding year.

TABLE 24.—*Graduates of Unapproved Medical Schools Registered, 1941-1946*

	Examination						Reciprocity & Endorsement						Total
	1941	1942	1943	1944	1945	1946	1941	1942	1943	1944	1945	1946	
Arizona	0	0	0	0	0	0	0	0	0	0	0	2	2
California	1	0	0	0	0	0	0	0	0	0	4	0	5
Florida	0	0	0	0	0	1	0	0	0	0	0	0	1
Illinois	51	51	57	45	115	45	0	0	0	0	0	1	365
Indiana	0	0	0	0	0	0	0	1	0	0	0	0	1
Iowa	0	0	0	0	0	1	1	0	0	0	0	1	3
Kentucky	0	0	2	0	0	0	0	0	0	0	0	0	2
Massachusetts	90	105	177	102	38	24	0	0	0	0	0	0	536
Mississippi	0	1	0	1	0	4	0	0	0	0	0	0	6
Missouri	1	0	1	0	0	0	0	0	0	1	1	0	4
Nebraska	0	0	0	0	0	0	0	0	0	0	0	1	1
Nevada	0	0	0	0	0	0	0	0	0	1	2	0	3
New Hampshire	0	0	0	0	0	0	0	0	0	0	1	0	1
New Jersey	0	0	0	0	0	0	8	0	0	0	0	0	8
New Mexico	0	0	1	0	0	0	0	0	0	0	1	0	2
New York	0	0	0	0	0	111	0	0	0	0	0	0	111
Ohio	0	0	0	0	0	6	0	0	0	0	0	0	6
Texas	0	0	0	0	0	0	0	0	0	0	0	1	1
Virginia	0	0	1	5	3	10	0	0	0	0	0	1	20
Washington	0	0	0	0	0	2	0	0	0	0	0	0	2
Wisconsin	0	0	0	0	0	0	0	0	1	0	1	0	2
Hawaii	1	0	1	0	0	0	0	0	0	0	0	0	2
Totals	144	157	240	153	156	204	9	1	1	2	10	7	1,084

GRADUATES OF UNAPPROVED SCHOOLS REGISTERED, 1941-1946

Recorded in table 24 are data regarding graduates of institutions which do not meet the minimum essentials of an acceptable medical school as outlined by the House of Delegates of the American Medical Association and administered by the Council on Medical Education and Hospitals. This table shows the numbers registered as medical licentiates in the United States and Hawaii by written examination or endorsement of credentials in the past six years, 1941 to 1946 inclusive. Figures are given separately for those licensed by written examination and by endorsement of credentials. In the six years shown, twenty-one states and Hawaii registered 1,054 by examination and 30 by endorsement of credentials. In 1946 there were 211 registered, 204 by examination and 7 without written examination in Arizona, Florida, Illinois, Iowa, Massachusetts, Mississippi, Nebraska, New York, Ohio, Texas, Virginia and Washington.

Illinois, which accepts for licensure the graduates of an unapproved school located in that state, and Massachusetts licensed the largest number of graduates of unapproved schools. In the latter state the institutions referred to in the table were not granted approval by the State Approving Authority of that state. Matriculants after Jan. 1, 1941 are not eligible for licensure in Massachusetts. Regulations have become effective in New York, Ohio and Virginia providing for licensure of unapproved graduates under certain conditions. In the latter two states they apply to physician veterans only. In some states (Mississippi, for example) licensure is sometimes obtained by special act of the legislature.

GRADUATES OF SCHOOLS OF OSTEOPATHY REGISTERED BY MEDICAL EXAMINING BOARDS, 1941-1946

The numbers of graduates of schools of osteopathy granted the privilege of practicing medicine or surgery or both by the examining boards of fourteen states and the District of Columbia for six years (1941-1946) are given in table 25. There have been 954 such individuals registered since 1941, 802 by examination and 152 without examination. In 1946 there were 201 so registered, 158 by examination and 43 by reciprocity in thirteen states—Colorado, Connecticut, Delaware, District of Columbia, Indiana, New Jersey, New York, Ohio, Oregon, Texas, Virginia, Wisconsin and Wyoming.

Following is a summary of the situation in the fifteen states and the District of Columbia providing for the licensure of osteopaths by the medical examining board:

In Colorado an osteopath receives a license to practice medicine. In Connecticut any registered osteopath may practice either medicine or surgery or both, as the case may be, if he passes a satisfactory examination before the medical examining board. In Delaware osteopaths are licensed as "osteopathic physicians." In the District of Columbia, osteopaths are granted the right to practice surgery. In Indiana the licenses issued to osteopaths under a 1945 amendment to the medical practice act authorize the holders to practice medicine and surgery. Licentiates in osteopathy prior to 1945 have now been authorized to practice osteopathy, surgery and obstetrics. In Massachusetts the medical practice act, by definition, includes osteopathy in the practice of medicine and does not differentiate the type of license issued to an osteopathic applicant. According to a law passed in Nebraska in 1943 "any person now licensed to practice osteopathy may, if application is made prior to July 1, 1948 and upon payment of the prescribed fee, take the first regular examination given after the application is made before the Board of Examiners in Medicine. . . . If successful he or she shall receive a license to practice medicine and surgery in the state." In New Hampshire, osteopaths are granted the right to practice medicine and surgery.

In New York a law approved April 10, 1946 provides that any osteopathic licentiate who had obtained the additional right to use instruments for minor surgical procedures and to use anesthetics, antiseptics, narcotics and biological products or any applicant who has met

TABLE 25.—*Graduates of Schools of Osteopathy Registered by Medical Boards, 1941-1946*

	Examination						Reciprocity & Endorsement						Total
	1941	1942	1943	1944	1945	1946	1941	1942	1943	1944	1945	1946	
Colorado	2	9	9	7	7	5	0	0	0	0	0	0	39
Connecticut	0	0	5	5	2	5	0	0	0	0	0	0	17
Delaware	0	0	0	3	0	0	0	0	0	0	0	4	7
Dist. Columbia	0	2	0	0	0	0	2	1	0	0	1	1	7
Indiana	3	4	2	3	0	43	3	2	3	3	4	7	77
Massachusetts	26	13	5	4	5	0	0	0	0	0	0	0	53
Nebraska	0	0	6	0	2	0	0	0	1	0	0	0	9
New Hampshire	0	0	0	3	0	0	0	1	1	2	0	0	7
New Jersey	32	9	18	30	15	9	0	0	0	0	0	0	113
New York	0	0	0	0	0	5	0	0	0	0	0	0	5
Ohio	0	0	158	72	48	47	0	0	0	3	1	7	336
Oregon	2	1	0	0	0	0	2	5	3	8	14	12	47
Texas	13	17	18	38	29	42	1	1	2	1	1	0	163
Virginia	3	0	0	0	0	1	1	0	0	0	0	0	5
Wisconsin	2	5	6	0	1	1	0	1	16	5	15	11	63
Wyoming	0	0	0	0	0	0	0	2	1	2	0	1	6
Totals	83	60	227	165	109	158	9	13	27	24	36	43	954

or shall meet all the preliminary and professional requirements as required as of September first, nineteen hundred thirty-six and has satisfactorily passed or shall satisfactorily pass the regular medical licensing examination shall be granted the right to practice medicine without limitation as defined by the statutes of the State of New York.

New Jersey provides that osteopaths licensed prior to Nov. 1, 1941 who furnish proof prior to that date of having served for a period of two years as an intern or resident surgeon in an osteopathic or medical hospital approved by the board of medical examiners, of having completed a postgraduate course of two years in a college of osteopathy or medicine approved by the board or of having had at least three years of practice in a hospital approved by the board can be admitted to an examination in pharmacology, therapeutics and surgery and, if successful, can obtain a license to practice medicine and surgery. Since 1941 all osteopathic applicants who have met the requirements of the medical practice act have been licensed to practice medicine and surgery.

A law passed in Ohio in 1943 gives osteopaths who obtain their licenses under that act the right to practice osteopathic medicine and surgery. In Oregon they are granted the right to practice "in the subjects" covered by the examination, which includes surgery. The medical practice act of Texas provides for the issuing of a license to practice medicine only and osteopaths are issued licenses unrestricted in scope. In Virginia osteopaths may obtain the right to use drugs and perform surgery with the use of instruments if they satisfy the

TABLE 26.—*Requirements of Candidates for Medical Licensure on the Basis of Credentials Obtained in Countries Other Than the United States and Canada*

	Admitted to Examination	Admitted by Endorsement of State License*	Citizenship	Basic Science Certificate	Internship in Hospital in United States	Further Medical Training	Examination Fee, Dollars	Other Requirements
Alabama	+	..	+	..	+	..	10	1
Arizona	Not accepted							
Arkansas (reg. and homeo. boards)	Not accepted							
California	+	+[21]	+[5]	..	+[18]	+[19]	25	11
Colorado	+	..	1st P	+	..	..	25[4]	2
Connecticut (regular board)	+	+	1st P	+	..	..	25	..
Delaware (regular board)	+	..	+	..	+	..	25	5,22
District of Columbia	+	+[6]	..	+	+	..	25	19
Florida	+	..	+	+	..	+[7]	25	..
Georgia	+	..	+	..	..	+[7]	20	..
Idaho	+	..	+	..	+	..	25	..
Illinois	+	..	1st P	..	+	..	15	..
Indiana	+	+	..	..	..	+[7]	25	..
Iowa	+[10]	..	+	+	+[2]	+[2]	25	..
Kansas	+	..	+	..	+[24]	..	25	11
Kentucky	Not accepted							
Louisiana (reg. and homeo. boards)	Not accepted							
Maine	+	+	+	..	+	..	27	11,28
Maryland (reg. and homeo. boards)	+	..	1st P	..	+[26]	..	25	19
Massachusetts	+	..	1st P	..	..	..	25	..
Michigan	+	+	+	+	+	+[7]	25	..
Minnesota	Not accepted							
Mississippi	+	..	+	..	+	..	10[3]	..
Missouri	+	..	+	..	+	..	15	..
Montana	Not accepted[23]							
Nebraska	+	+	+	+	..	..	25	..
Nevada	Not accepted							
New Hampshire	+	+[12]	+	..	+	..	20	..
New Jersey	+	+	+	..	+[17]	..	25	..
New Mexico	Not accepted							
New York	+	+	1st P	..	..	..	25	14
North Carolina	Not accepted							
North Dakota	+	..	+	..	+	..	25	11
Ohio	+	+	+	..	..	..	25	13
Oklahoma	Not accepted							
Oregon	Not accepted							
Pennsylvania	+	..	1st P	..	+	..	25	..
Rhode Island	+	..	1st P	+	+[16]	+[16]	20	15
South Carolina	Not accepted							
South Dakota	+	..	1st P	+	+[17]	..	25	..
Tennessee	+	..	+	+	..	..	25	..
Texas	+	+	+	..	..	..	25	..
Utah	Not accepted							
Vermont	Not accepted[28]							
Virginia	+	..	+	15	15	+	25	..
Washington	+	..	1st P	+	+	+[7]	25	9
West Virginia	Not accepted							
Wisconsin	Not accepted							
Wyoming	Not accepted							
Alaska	+	+	+	+	+	..	25	..
Hawaii	+	..	+	..	+	..	25	12
Puerto Rico	+	+	+	..	+	..	25	..

* Refer to chart of "Reciprocity and Endorsement Policies" for further data.

1. Certificate of National Board of Medical Examiners or licensure in country in which school of graduation is located or in the country of his nativity.

2. Internship or one year in medical school in United States.

3. Certificate of National Board of Medical Examiners.

4. For graduates of last five years; if more than five years $50.

5. Residence of one year in Delaware.

6. If similar privileges are accorded licentiates of District of Columbia by licensuing agency of jurisdiction from which applicant comes.

7. Senior year in class A medical school in United States or one year assistant residency in approved hospital in United States.

8. Not required if country in which applicant is licensed will admit to practice citizens of the United States licensed to practice in some state or upon proof of requirements similar to those required by California of graduates of foreign medical schools.

9. Enemy aliens not accepted.

10. Application must be filed six months prior to date of examination.

11. Licensed to practice medicine and surgery in country in which school of graduation is located, otherwise required to complete senior year in approved medical school in United States.

12. Diplomates of National Board of Medical Examiners eligible.

13. License to practice medicine and surgery in the country in which the school of graduation is located.

14. Matriculants after Jan. 1, 1940 not accepted.

15. At the discretion of the board.

16. Internship and graduate work.

17. Internship completed in foreign countries after July 1, 1934 not acceptable.

18. Rotating internship in approved hospital in the United States or completion of senior year in class A medical school in the United States.

19. These requirements apply also to graduates of Canadian schools.

20. Graduates from foreign medical colleges accepted if they present also a diploma from an approved medical school in the United States.

21. Provided standard was the same as California on the same date.

22. Degree from an American medical college acceptable to the Medical Council of Delaware required.

23. Diplomates of the National Board of Medical Examiners accepted. Citizenship required.

24. In lieu of internship, certificate from three graduates of applicant's medical school licensed to practice medicine in United States accepted.

25. Effective July 1, 1943.

26. Homeopathic board requires one year internship in homeopathic hospital in the United States.

27. Will consider limited license for applicant with acceptable credits from National Board of Medical Examiners and states maintaining reciprocity.

28. No applications accepted from countries other than England (certain schools), Ireland, Scotland and Australia.

board of medical examiners that they are qualified to do so. Wisconsin grants osteopaths the privilege to practice surgery, and in Wyoming the statutes contain no specific provision for the licensing of osteopaths. The medical practice act of the latter state provides that the certificate issued to all applicants "shall be deemed licenses to practice medicine in all branches in which the applicant has taken examination in the state."

PHYSICIANS EXAMINED ON BASIS OF CREDENTIALS OBTAINED IN COUNTRIES OTHER THAN THE UNITED STATES AND CANADA

The Council on Medical Education and Hospitals does not grade or classify medical schools outside the United States and Canada. It does not attempt to evaluate institutions which it is not in a position to visit to determine whether they meet the minimal essentials of an acceptable medical school as outlined by the Council. This was true even before the war.

For a period of twelve years beginning in 1926 the credentials of physicians coming from abroad were verified by the Council through official correspondence with the medical schools directly or through the diplomatic services. Prior to the onset of the war in Europe it was necessary to discontinue this effort, and on the licensing boards rests the responsibility of evaluating the credentials presented by these graduates. In the 1942 edition of the American Medical Directory a symbol in the biographic data of foreign graduates indicates when the information given is the licensing board's record of the credential accepted as meeting the educational qualifications for licensure. The absence of the symbol may be interpreted to indicate that official verification is on file in the office of the Council.

A committee composed of representatives of various interested organizations has been formed to consider the problem of evaluation of foreign credentials submitted by physicians and students from foreign medical schools. The first meeting of the committee was held in February 1947. No positive recommendations emerged from this meeting, but the discussions will be continued and an attempt made to obtain pertinent data pertaining to schools and educational procedures in all countries.

The requirements of candidates for medical licensure in the United States, Alaska, Hawaii and Puerto Rico on the basis of credentials obtained in countries other than the United States and Canada are given in table 26. Seventeen states report that the holders of such credentials are not eligible for licensure. Nineteen states, Alaska, Hawaii and Puerto Rico require full citizenship and ten states naturalization papers as a condition precedent to taking the examination. The District of Columbia and Indiana make no reference to citizenship. In some states the recognition or nonrecognition of such individuals is by rule of the board; in others the provision is by statute. Ten states and Alaska which will admit foreign graduates to practice, require a certificate from the state board of examiners in the basic sciences. In twenty states, Alaska, Hawaii and Puerto Rico an internship in a hospital in the United States is a prerequisite. Additional qualifications of individual states are given in footnotes. Tennessee, which heretofore did not accept for licensure graduates of foreign faculties of medicine, has been added to this table in 1946.

Table 27 presents figures relating to physicians examined on the basis of credentials obtained in countries other than the United States and Canada by licensing boards in 1946. The figures represent both American and foreign born physicians educated abroad. Eighty-six faculties of medicine and four licensing corporations of sixteen European countries and fourteen other countries are represented. There were 494 physicians examined by twenty states, the District of Columbia, Hawaii and Puerto Rico, of whom 220 passed and 274, 55.5 per cent, failed. Graduates of the University of Vienna represented the largest group, 67, who were examined in twelve states, with a failure percentage of 59.7. Eight states examined 32 graduates of the University of Berlin, of whom 56.2 per cent failed. Forty physicians who hold the registrable qualification, Licentiate of the Royal College of Physicians and of Surgeons, Edinburgh, and the Royal Faculty of Physicians and Surgeons of Glasgow were examined in four states, and

TABLE 28.—*Physicians Examined on the Basis of Credentials Obtained in Countries Other Than the United States and Canada, 1930-1946*

Year	Number Examined	Passed	Percentage Failed
1930	167	92	44.9
1931	158	91	42.4
1932	182	96	47.3
1933	200	129	35.5
1934	285	170	40.2
1935	437	303	30.7
1936	588	382	35.0
1937	920	637	30.8
1938	1,164	716	38.5
1939	1,691	839	50.4
1940	2,088	948	54.7
1941	1,717	698	59.2
1942	1,630	890	45.4
1943	1,031	518	49.8
1944	691	325	53.0
1945	475	209	56.0
1946	494	220	55.5
Totals	13,918	7,263	47.8

30 per cent failed. Fifteen or more graduates of the universities of Havana, Bologna, Rome and Lausanne also were examined in the United States last year. Fewer than 5 graduates of sixty-five foreign schools appeared for licensure last year.

The greatest number of foreign graduates examined by any one state was 315 in New York, of whom 106 passed and 209 (66.3 per cent) failed. No other state tested more than 42 of these physicians. Fewer than 5 were examined by nine states.

Table 28 records the number of graduates of faculties of medicine abroad examined for medical licensure in the United States in the seventeen years 1930 to 1946 inclusive. In this period 13,918 were examined, of whom 7,263 passed and 47.8 per cent failed. Although there has been a considerable reduction in the number of foreign graduates seeking licensure in recent years, the percentage of failures has not changed significantly. The greatest number of failures occurred in 1941, when 59.2 per cent failed. At no time in this seventeen year period did fewer than 30.7 per cent fail.

In 1936 the number of foreign graduates began to increase, so that in 1940 there were over three times

TABLE 27.—*Physicians Examined on the Basis of Credentials Obtained in Countries Other Than the United States and Canada, 1946*

| Marginal Number | | 1 California | | 2 Colorado | | 3 Connecticut | | 4 Dist. of Columbia | | 5 Georgia | | 6 Illinois | | 7 Indiana | | 8 Maine | | 9 Maryland | | 10 Massachusetts | | 11 Missouri | | 12 Nebraska | | 13 New Hampshire | | 14 New Jersey | | 15 New York | | 16 Ohio | | 17 Pennsylvania | | 18 Rhode Island | | 19 Texas | | 20 Virginia | | 21 Washington | | 22 Hawaii and Puerto Rico | | Totals | Examined—Passed | Examined—Failed | Percentage of Failures | Number of Boards Examined by | Marginal Number |
|---|---|---

| | | |

as many tested as in 1936. Since 1940 there have been annual decreases, though the number examined in 1946 was slightly more than in 1945, but the annual

Officers of State Boards of Medical Examiners

Alabama	Dr. D. G. Gill, 519 Dexter Ave., Montgomery 4.
Arizona	Dr. J. H. Patterson, 826 Security Bldg., Phoenix.
Arkansas	Dr. L. J. Kosminsky, Texarkana.
California	Dr. Frederick N. Scatena, 1020 N St., Sacramento 14.
Colorado	Dr. J. B. Davis, 831 Republic Bldg., Denver 2.
Connecticut	Dr. Creighton Barker, 258 Church St., New Haven.
Delaware	Dr. J. S. McDaniel, 229 S. State St., Dover.
District of Columbia	Dr. G. C. Ruhland, 6012 E. Municipal Bldg., Washington.
Florida	Dr. Harold D. Van Schaick, 2736 S.W. 7th Ave., Miami 36.
Georgia	Mr. R. C. Coleman, 111 State Capitol, Atlanta 3.
Idaho	Miss Estella S. Mulliner, 355 State Capitol Bldg., Boise.
Illinois	Mr. Philip M. Harman, Springfield.
Indiana	Miss R. V. Kirk, 627 K. of P. Bldg., Indianapolis 4.
Iowa	Mr. H. W. Grefe, Capitol Bldg., Des Moines 19.
Kansas	Dr. J. F. Hassig, 905 N. Seventh St., Kansas City 10.
Kentucky	Dr. P. E. Blackerby, 620 S. Third St., Louisville 2.
Louisiana	Dr. R. B. Harrison, 1507 Hibernia Bank Bldg., New Orleans.
Maine	Dr. A. P. Leighton, 192 State St., Portland.
Maryland	Dr. E. H. Kloman, 1215 Cathedral St., Baltimore 1.
Massachusetts	Dr. H. Q. Gallupe, 413 E. State House, Boston 33.
Michigan	Dr. J. E. McIntyre, 100 W. Allegan St., Lansing 8.
Minnesota	Dr. J. F. Du Bois, 230 Lowry Medical Arts Bldg., St. Paul.
Mississippi	Dr. R. N. Whitfield, Jackson 113.
Missouri	Mr. J. A. Hailey, State Capitol Bldg., Box 4, Jefferson City.
Montana	Dr. O. G. Klein, 302 N. Main St., Helena.
Nebraska	Mr. O. F. Humble, 1009 State Capitol Bldg., Lincoln.
Nevada	Dr. G. H. Ross, 215 N. Carson St., Carson City.
New Hampshire	Dr. John S. Wheeler, 107 State House, Concord.
New Jersey	Dr. E. S. Hallinger, 28 W. State St., Trenton.
New Mexico	Dr. Le Grand Ward, 141 Palace Ave., Santa Fe.
New York	Dr. J. L. Lochner, 315 State Education Bldg., Albany.
North Carolina	Dr. Ivan Proctor, 226 Hillsboro St., Raleigh.
North Dakota	Dr. G. M. Williamson, 4½ S. Third St., Grand Forks.
Ohio	Dr. H. M. Platter, 21 W. Broad St., Columbus.
Oklahoma	Dr. F. C. Gallaher, 813 Braniff Bldg., Oklahoma City.
Oregon	Miss L. M. Conlee, 608 Failing Bldg., Portland 4.
Pennsylvania	Mrs. M. G. Steiner, 351 Education Bldg., Harrisburg.
Rhode Island	Mr. Thomas B. Casey, 366 State Office Bldg., Providence.
South Carolina	Dr. N. B. Heyward, 1329 Blanding St., Columbia.
South Dakota	Dr. Gilbert Cottam, Capitol Bldg., Pierre.
Tennessee	Dr. H. W. Qualls, 130 Madison Ave., Memphis 3.
Texas	Dr. T. J. Crowe, 918-20 Texas Bank Bldg., Dallas 2.
Utah	Mr. W. R. McEntire, 324 State Capitol Bldg., Salt Lake City.
Vermont	Dr. F. J. Lawliss, Richford.
Virginia	Dr. K. D. Graves, 30½ Franklin Rd., S.W., Roanoke.
Washington	Miss Virginia Wotherspoon, Olympia.
West Virginia	Dr. N. H. Dyer, State Capitol, Charleston 5.
Wisconsin	Dr. C. A. Dawson, Tremont Bldg., River Falls.
Wyoming	Dr. G. M. Anderson, Capitol Bldg., Cheyenne.
Alaska	Dr. W. M. Whitehead, Box 140, Juneau.
Canal Zone	Dr. M. C. Stayer, Balboa Heights.
Hawaii	Dr. S. E. Doolittle, 881 S. Hotel St., Honolulu 53.
Puerto Rico	Mr. Luis Cueto Coll, Parada 22, Santurce.
Virgin Islands	Dr. K. Knud-Hansen, Charlotte Amalie.

total is still in excess of the number licensed annually prior to 1935 and before the increased migration of foreign physicians to this country from Europe.

BOARDS OF EXAMINERS IN THE BASIC SCIENCES

A basic science law provides for the establishment of a board of examiners and requires that each person who desires to practice the healing arts appear before that board and demonstrate his knowledge of the basic sciences. Such boards are distinct from licensing boards. A certificate of proficiency in the basic sciences does not authorize the possessor to practice the healing art; it enables him only to apply for licensure so to practice.

A basic science certificate is a prerequisite for licensure in seventeen states, the District of Columbia and Alaska. Alaska was added to this group by the Territorial Legislature on April 3, 1946. The first states to adopt such legislation were Connecticut and Wisconsin in 1925. Other states comprising the group, together with the year of enactment of their basic science law, are recorded in table 29.

TABLE 29.—*States Having Basic Science Laws and Year of Enactment*

Alaska	1946	Nebraska	1927
Arizona	1936	New Mexico	1941
Arkansas	1929	Oklahoma	1937
Colorado	1937	Oregon	1933
Connecticut	1925	Rhode Island	1940
District of Columbia	1929	South Dakota	1939
Florida	1939	Tennessee	1943
Iowa	1935	Washington	1927
Michigan	1937	Wisconsin	1925
Minnesota	1927		

TABLE 30.—*Subjects Included in Basic Science Examinations*

	Examinations Required in							
	Anatomy	Bacteriology	Chemistry	Diagnosis	Hygiene	Pathology	Physiology	Public Health
Alaska	+	+	+	..	+	+	+	..
Arizona	+	+	+	..	+	+	+	..
Arkansas	+	+	+	..	..	+	+	..
Colorado	+	+	+	..	..	+	+	..
Connecticut	+	..	..	+	+	+	+	..
Dist. Columbia	+	+	+	..	..	+	+	..
Florida	+	+	+	..	..	+	+	..
Iowa	+	+	+	..	+	+	+	..
Michigan	+	+	+	..	+	+	+	+
Minnesota	+	+	+	..	+	+	+	..
Nebraska	+	+	+	..	+	+	+	..
New Mexico	+	+	+	..	..	+	+	..
Oklahoma	+	+	+	..	..	+	+	..
Oregon	+	..	+	..	+	+	+	..
Rhode Island	+	+	+	..	..	+	+	..
South Dakota	+	+	+	..	..	+	+	..
Tennessee	+	+	+	..	..	+	+	..
Washington	+	..	+	..	+	+	+	..
Wisconsin	+	..	..	+	..	+	+	..

The subjects in which examinations are conducted in the respective states, the District of Columbia and Alaska, as shown in table 30, are specified by statute. The examining boards are not authorized to add any subjects or to refrain from giving an examination in any subject specified by law, although the laws in some instances provide for certification without examination by the endorsement of a basic science certificate issued in another state, passing the National Board examination or the acceptance of examinations in the required subjects by a licensing board.

All nineteen boards examine in anatomy, pathology and physiology, seventeen examine in chemistry, fifteen in bacteriology, nine in hygiene, two in diagnosis and one in public health.

The results of examinations held and the number of certificates issued on the basis of reciprocity or

endorsement during 1946 are presented in tables 31 and 32 as reported by the respective boards. A candidate in applying for a basic science certificate is not required by law to mention his school of practice. However, by checking the biographic records of physicians and medical student records of the American Medical Association and various directories it has been possible to determine the profession of the majority of candidates. Thus it has been possible to tabulate the figures in four groups, namely physicians and medical students, osteopaths, chiropractors and unclassified applicants. The latter category includes those for whom it was not possible to determine the profession represented. In Rhode Island doctors of dentistry represent the unclassified group. It may be assumed that others in this unclassified group include osteopaths, chiropractors and also naturopaths who have not been identified by the reference material available.

The nineteen basic science boards in operation in 1946 examined a total of 3,333 candidates, table 31.

TABLE 31.—*Basic Science Certificates Issued by Examination, Reciprocity and Endorsement, 1946*

	Examination					Reciprocity, Endorsement or Waiver					
	Physicians and Medical Students	Osteopaths	Chiropractors	Unclassified	Totals	Physicians and Medical Students	Osteopaths	Chiropractors	Unclassified	Totals	Registered
Alaska	3	0	0	0	3	2	0	0	0	2	5
Arizona	51	0	0	0	51	108	39	1	0	148	199
Arkansas	56	1	1	0	58	23	0	0	0	23	81
Colorado	169	1	0	1	171	75	9	1	0	85	256
Connecticut	171	5	4	1	181	0	0	0	0	0	181
District of Columbia	27	0	0	0	27	149	0	0	0	149	176
Florida	304	4	1	0	309	0	0	0	0	0	309
Iowa	91	49	5	3	148	155	46	2	0	203	351
Michigan	218	2	0	2	222	21	19	1	0	41	263
Minnesota	278	20	1	2	301	140	2	0	0	142	443
Nebraska	99	0	0	0	99	56	0	0	0	56	155
New Mexico	101	10	0	0	111	0	0	0	0	0	111
Oklahoma	58	0	0	0	58	58	0	0	0	58	116
Oregon	138	2	0	2	142	67	23	2	0	92	234
Rhode Island	78	0	1	34	113	0	0	0	0	0	113
South Dakota	42	0	0	2	44	97	4	2	1	104	148
Tennessee	169	0	0	0	169	141	0	0	0	141	310
Washington	136	5	0	0	141	0	0	0	0	0	141
Wisconsin	202	7	1	0	210	216	11	3	0	230	440
Totals	2,391	106	14	47	2,558	1,308	153	12	1	1,474	4,032

Physicians and medical students represent the greatest number examined. There were 2,937 in this group. There were also examined 196 osteopaths, 40 chiropractors and 77 in the unclassified group. Of all applicants 23.3 per cent failed, of the physicians and medical students examined 18.7 per cent failed, osteopaths 45.1 per cent, chiropractors 65 per cent and unclassified 39 per cent. The basic science board of Florida examined the greatest number, 407, representing 397 physicians and medical students and 10 others with 24.1 per cent failures. Iowa, Michigan and Minnesota examined more than 300. The percentage of failures in these states was 58.2, 34.9 and 16.2 respectively. New Mexico and Alaska reported no failures.

Osteopaths were examined in Arkansas, Colorado, Connecticut, District of Columbia, Florida, Iowa, Michigan, Minnesota, New Mexico, Oregon, Tennessee, Washington and Wisconsin. Chiropractors appeared for certification before the boards in Arkansas, Connecticut, District of Columbia, Florida, Iowa, Michigan, Minnesota, Rhode Island, Washington and Wisconsin.

It is the policy of the Arizona Board of Examiners in the Basic Sciences in reporting results of its examinations to omit the names of applicants who fail examinations. The number who fail are therefore recorded only in the total column. Iowa in 1946 reported failures by total number only in reporting results of one of their examinations.

TABLE 32.—*Applicants Examined in Basic Sciences, 1946*

	Physicians and Medical Students		Osteopaths		Chiropractors		Unclassified		Total Examined	Passed	Failed	Percentage Failed
	P	F	P	F	P	F	P	F				
Alaska	3	0	0	0	0	0	0	0	3	3	0	0.0
Arizona	51	0	0	0	0	0	0	0	71	51	20*	28.2
Arkansas	56	2	1	0	1	0	0	0	60	58	2	3.3
Colorado	169	30	1	4	0	0	1	0	205	171	34	16.6
Connecticut	171	5	5	1	4	2	1	2	191	181	10	5.3
District of Columbia	27	2	0	1	0	1	0	0	31	27	4	12.9
Florida	304	93	4	3	1	2	0	0	407	309	98	24.1
Iowa	91	65	49	48	5	16	3	14	354	148	206†	58.2
Michigan	218	110	2	7	0	1	2	1	341	222	119	34.9
Minnesota	278	42	20	16	1	0	2	0	359	301	58	16.2
Nebraska	99	24	0	0	0	0	0	0	123	99	24	19.5
New Mexico	101	0	10	0	0	0	0	0	111	111	0	0.0
Oklahoma	58	5	0	0	0	0	0	0	63	58	5	79.4
Oregon	138	62	2	5	0	0	2	2	211	142	69	32.7
Rhode Island	78	3	0	0	1	1	34	10	127	113	14	11.0
South Dakota	42	15	0	0	0	0	2	1	60	44	16	26.7
Tennessee	169	36	0	1	0	0	0	0	206	169	37	18.0
Washington	136	15	5	4	0	1	0	0	161	141	20	12.4
Wisconsin	202	37	7	0	1	3	0	0	249	210	39	15.7
Total—Examined	2,937		196		40		77		3,333	.....	...	....
Totals—Passed	2,391		106		14		47		.....	2,558	...	....
Totals—Failed	546		90		26		30		.....	.....	775	....
Percentage Failed	18.7		45.1		65.0		39.0		.....	.....	...	23.3

* Nature of practice undeterminable since names of failures not supplied.

† Nature of practice of 63 undeterminable since names of failures not supplied.

Twelve states, the District of Columbia and Alaska granted basic science certificates without examination, by reciprocity, endorsement, waiver or exemption. There were 1,474 certificates awarded by this method

TABLE 33.—*Total Candidates for Basic Science Certification, 1927-1946*

	Number of Boards	Physicians and Medical Students						Other Practitioners				
		Examined	Passed	Failed	Percentage Failed	Endorsement	Total Certified	Examined	Passed	Failed	Percentage Failed	Endorsement	Total Certified
1927	5	305	279	26	8.5	26	305	22	15	7	31.8	1	16
1928	5	646	586	60	9.3	19	605	50	31	28	47.5	0	31
1929	7	668	610	58	8.7	75	685	66	31	35	53.0	0	31
1930	7	685	606	79	11.5	118	724	78	39	48	61.5	4	34
1931	7	680	586	94	13.8	141	727	107	48	59	55.1	0	48
1932	7	657	590	67	10.2	106	696	78	44	34	43.6	12	56
1933	8	601	527	74	12.3	121	648	60	30	30	50.0	10	40
1934	9	815	725	90	11.0	127	852	51	26	25	49.0	11	37
1935	10	882	761	121	13.7	110	871	74	33	41	55.4	4	37
1936	10	1,032	891	141	13.7	230	1,121	66	26	40	60.6	13	39
1937	12	1,231	1,061	170	13.8	192	1,253	113	41	72	63.7	10	51
1938	12	1,168	1,026	142	12.2	267	1,293	158	70	88	55.7	26	96
1939	14	1,141	1,013	128	11.2	727	1,740	218	97	121	55.5	294	391
1940	16	1,303	1,140	163	12.5	324	1,464	280	153	127	43.9	22	175
1941	17	1,768	1,560	208	11.8	280	1,840	356	191	165	46.3	73	264
1942	17	1,725	1,476	249	14.4	213	1,689	497	249	248	49.9	91	340
1943	18	2,330	2,098	232	10.0	296	2,394	389	211	178	45.8	86	297
1944	18	2,284	1,868	416	18.2	222	2,090	465	276	189	40.6	87	363
1945	18	2,576	2,146	430	16.6	412	2,558	397	193	204	51.4	172	365
1946	19	2,937	2,391	546	18.7	1,308	3,699	313	167	146	46.6	166	333
Totals	.. 25,434		21,940	3,494	13.6	5,314	27,254	3,847	1,962	1,885	59.0	1,082	3,044

in 1946. By both examination and endorsement, 4,032 certificates of proficiency were issued. The number of successful candidates in these two groups by states are recorded in table 32. Among the successful candi-

dates were 3,699 physicians or medical students, 259 osteopaths, 26 chiropractors and 48 others. Wisconsin certified the most applicants without examination, 230, of whom 216 were physicians, 11 osteopaths and 3 chiropractors. Florida and Washington have no reciprocal relations. None were certified without examination in 1946 in Connecticut, New Mexico and Rhode Island.

OFFICIALS OF BASIC SCIENCE BOARDS

Arizona—Mr. Francis A. Roy, Science Hall, University of Arizona, Tucson.
Arkansas—Mr. L. E. Gebauer, 701 Main Street, Little Rock.
Colorado—Esther B. Starks, D. O., 1459 Ogden Street, Denver.
Connecticut—Mr. C. M. Bakewell, 250 Church Street, New Haven.
District of Columbia—Dr. G. C. Ruhland, 6012 E. Municipal Building, Washington.
Florida—Dr. M. W. Emmell, University of Florida, Gainesville.
Iowa—Dr. Ben H. Peterson, Coe College, Cedar Rapids.
Michigan—Miss Eloise LeBeau, 101 N. Walnut Street, Lansing.
Minnesota—Dr. Raymond N. Bieter, 105 Millard Hall, University of Minnesota, Minneapolis 14.
Nebraska—Mr. Oscar F. Humble, 1009 State Capitol Building, Lincoln 9.
New Mexico—Miss Marion M. Rhea, 114 E. Marcy St., Santa Fe.
Oklahoma—Dr. Frank C. Gallagher, 813 Braniff Bldg., Oklahoma City.
Oregon—Mr. C. D. Byrne, University of Oregon, Eugene.
Rhode Island—Mr. Thomas B. Casey, 366 State Office Building, Providence.
South Dakota—Dr. G. M. Evans, Yankton.
Tennessee—Dr. O. W. Hyman, 874 Union Avenue, Memphis.
Washington—Mr. Harry C. Huse, Olympia.
Wisconsin—Mr. William H. Barber, Watson and Scott Sts., Ripon.

Altogether 4,032 candidates received basic science certificates in the seventeen states, the District of Columbia and Alaska, ranging from 5 in Alaska to 443 in Minnesota, while 775 failed after examination during the year 1946.

Table 33 records the number of candidates examined and certified, and the number certified without examination by basic science boards in twenty years, 1927 to 1946 inclusive. In 1927 when five boards were functioning, there were 305 examined, of whom 8.5 per cent failed, and 22 others, of whom 31.8 per cent failed. In 1946 there were examined 2,937 physicians with 18.7 per cent failures and 313 others, of whom 46.6 per cent failed.

In the twenty year period 25,434 physicians and medical students were examined, of whom 21,940 were successful in their examinations. In the same period 3,847 other practitioners took the test and 1,962 were successful. In this period 5,314 physicians and 1,082 others were certified without examination. In twenty years 30,298 certificates have been granted to 27,254 physicians and to 3,044 other practitioners.

Alaska was added to the group requiring a basic science certificate as a prerequisite to the practice of the healing art in 1946. The law provides for the issuance of a certificate without examination to diplomates of the National Board of Medical Examiners and to those persons who have passed examinations before an examining board of a state or foreign country who will accord a like privilege to certificants of the basic science board of Alaska. No other new basic science legislation was enacted in the United States in 1946.

The principle of basic science legislation is to provide a means of insuring that all who seek licensure to care for sick and injured persons shall first possess a reasonable knowledge of the sciences fundamental to the healing art. The enforcement of such laws affects mostly the group classified as "other practitioners." This is particularly significant when one takes into account that the testing of individuals for basic science registration is made by nonmedical examiners. The results demonstrate that, in general, practitioners other than regular physicians are poorly equipped in the fundamentals of medicine and should not be entrusted to care for the health of the people.

Efforts are being made by the American Association of Basic Science Boards to provide information based on experience to states contemplating new basic science board legislation and to develop procedures to facilitate reciprocity arrangements. In some instances basic science certification by reciprocity is unnecessarily difficult because of otherwise unimportant differences in the laws of the various states. A committee of three representatives of the Federation of State Medical Boards has been appointed to meet with a similar committee representing the state basic science boards in an effort to better integrate the operation of basic science laws with the system of medical licensure now existing in the various states. This committee has not as yet reported the results of its findings.

NATIONAL BOARD OF MEDICAL EXAMINERS

The certificate of the National Board of Medical Examiners is accepted as an adequate qualification for a medical license by the licensing authorities of forty-four states, the District of Columbia, Alaska, Hawaii, Puerto Rico and the Canal Zone. The National Board certificate is not recognized at present by the licensing boards of Florida, Montana, Nevada and Wisconsin. Nevada has temporarily suspended reciprocal relations in medical licensure. The licensing board in Louisiana exempts diplomates of the National Board from the state examination if they have been licensed in a state with which Louisiana reciprocates. Additional examinations are required by some of the state licensing boards. These are oral examinations in Illinois, Maine, Rhode Island and Wyoming, a brief supplemental written examination in Michigan, a rotating internship in Pennsylvania and two years of medical practice in Delaware. The states, territories and possessions which will endorse the certificate of the National Board of Medical Examiners are recorded in table 34.

TABLE 34.—*States Endorsing Certificates of the National Board of Medical Examiners*

Alabama	Illinois	Missouri	Puerto Rico
Alaska	Indiana	Nebraska	Rhode Island
Arizona	Iowa	New Hampshire	South Carolina
Arkansas	Kansas	New Jersey	South Dakota
California	Kentucky	New Mexico	Tennessee
Canal Zone	Louisiana	New York	Texas
Colorado	Maine	North Carolina	Utah
Connecticut	Maryland	North Dakota	Vermont
Delaware	Massachusetts	Ohio	Virginia
Dist. of Columbia	Michigan	Oklahoma	Washington
Georgia	Minnesota	Oregon	West Virginia
Hawaii	Mississippi	Pennsylvania	Wyoming
Idaho			

The basic science boards of Connecticut, Iowa, Minnesota, Nebraska, Oklahoma, Tennessee, the District of Columbia and Alaska honor the examination of the National Board and give a qualifying certificate to its diplomates without further examination. South Dakota exempts medical officers of World War II from the basic science requirement.

Diplomates of the National Board are admitted to the final examination of the Examining Board in England, the Triple Qualification Board of Scotland and the Conjoint Board in Ireland. These final examinations are both written and oral and correspond to parts II and III of the National Board. The National Board, in turn, admits the diplomates of these boards directly to parts II and III of its examination, provided they hold a degree in medicine from an acceptable university. The certificate of the National Board has in the past been recognized in Lebanon (Syria), Spain and Turkey, under certain conditions in South Africa and in other foreign countries.

Diplomates are exempt from some of the qualifications required by the United States Public Health Service.

Requirements for admission to the National Board examinations include a standard four year high school course, two years of acceptable college work including English, physics, chemistry, biology and a foreign language and a medical education satisfactorily completed in an approved school in this country or Canada. Graduates of the university medical schools of Great Britain and Ireland are admitted to the examination provided these graduates have been licensed to practice in the country in which the school attended is located.

The almost universal recognition of the examinations of the National Board is evidenced by the acceptance of the board's examinations by many medical schools as part of their own examination and promotion procedure. At some of the schools the students are required to pass part I at the end of the second year and part II at the end of the fourth year. Other schools require that part II be passed at the end of the fourth year. Candidates who fail to pass the National Board examinations are given a supplemental examination at most schools. The schools that require their students to take the National Board's examinations under one plan or another are Albany, Boston, Buffalo, Duke, George Washington, Harvard, Long Island, New York Medical College and Yale. In addition to the schools named there are a few others at which those students who voluntarily take and pass the National Board's examinations, either in part I or in part II, are excused from the corresponding final school examinations. This group of schools includes Colorado, Georgetown, Illinois, Loyola, Minnesota, Pennsylvania, Tufts and the Woman's Medical College. Regarding this plan the board states that "this practice places additional work and responsibility on the National Board of Medical Examiners. The board believes, however, that such use of its examinations is of definite value to the board because it necessitates that the examination be kept in close step with present medical education in this country. It appreciates the confidence in the fairness and thoroughness of its examinations that is implied by the substitution of the board's examinations for the former college comprehensive examination."

In the following paragraphs data are presented for the twenty-eighth consecutive year regarding the examinations conducted and the issuance of certificates by the National Board of Medical Examiners. These data are based on official reports received periodically from the executive office of the board. The awarding of certificates to candidates forms a part of their biographic records maintained by the American Medical Association.

The first examination was given by the National Board in October 1916. From that date and up to and including a test held in June 1921, eleven examinations were given and 268 candidtaes were certified. The results of each examination during this period are given in table 35. These data, together with subsequent tables containing figures to and including 1946, have been presented annually in THE JOURNAL for twenty-nine consecutive years.

Since 1922 the examination of the National Board has been divided into three separate parts, which must be taken and completed in the following sequence: part I, consisting of a written examination in the basic sciences; part II, a written examination in five major clinical subjects, and part III, a clinical and practical examination in six major clinical divisions and their component subjects or subdivisions.

The tables that are hereinafter presented enumerate the results of examinations in parts I, II and III for each calendar year since 1922, including those who passed and failed examinations and those certified.

Three examinations each were given in parts I and II in 1946 in various approved medical schools throughout the country. Examinations in part III are given under the direction of local subsidiary boards at

TABLE 35.—*National Board Examinations, 1916-1921*

Date	Total Examined	Failed	Percentage Failed
October 1916	10	5	50.0
June 1917	12	3	25.0
October 1917	28	6	21.4
January 1918	20	2	10.0
April 1918	23	5	21.7
December 1918	16	1	6.3
June 1919	52	1	1.9
February 1920	48	12	25.0
May 1920	60	14	23.3
February 1921	16	5	31.3
June 1921	40	3	7.5
Totals	325	57	17.5

times sufficiently frequent to accommodate all eligible candidates. Subsidiary boards have been organized for this purpose in twenty-four centers. Examinations in part III were held in 1946 during the months of March, April, June, October, November and December.

A candidate is eligible for part 1 who has met the premedical requirements and has completed successfully the first two years of work in an approved medical school. An incomplete examination is allowed candidates taking part I at the end of their second medical year in schools whose third year curriculums include courses in one or two subjects of this part. These examinations in the subjects not yet completed are therefore postponed and may be taken at any examination period after the candidate has completed them in his medical school. They are recorded in these statistics under the heading "Incomplete Examinations" and are excluded from the calculations referring to the percentage of failures. Any candidate not entitled to take an incomplete examination in part I may, if he so elects, take a divided examination by writing any four subjects at one time and the remaining two within thirteen months.

A candidate is eligible for part II who has passed part I and has completed successfully a four year medical course in an approved medical school.

The figures in tables 36 and 37 cover details of each examination given during 1946 and since 1922

and include some who fail and are reexamined during the same year and those who pass parts I and II in the same year. They represent, therefore, examinations conducted and not individuals examined.

TABLE 36.—*National Board Examinations in Part I, 1922-1946*

Date	Total Examinations	Passed	Incomplete	Failed	Percentage Failed
February 1946	659	424	178	57	11.7
May 1946	1,276	668	508	100	14.3
September-October 1946	1,213	603	503	107	15.1
Totals	3,148	1,695	1,189	264	13.5
1922	388	263	58	67	20.3
1923	507	349	77	81	18.8
1924	591	415	69	107	20.5
1925	608	400	50	158	28.3
1926	625	436	104	85	16.3
1927	702	452	159	91	16.8
1928	843	533	231	79	12.9
1929	1,006	675	331	90	11.8
1930	1,260	801	345	114	12.5
1931	1,277	755	425	97	11.4
1932	1,307	847	371	89	9.5
1933	1,234	782	316	136	14.8
1934	1,241	809	347	85	9.5
1935	1,264	785	410	69	8.1
1936	1,344	858	363	123	12.5
1937	1,435	871	415	149	14.6
1938	1,654	986	508	160	14.0
1939	1,733	1,048	460	225	17.7
1940	1,653	1,009	375	269	16.4
1941	1,640	1,087	346	207	16.0
1942	1,867	1,204	471	192	13.8
1943	2,656	1,441	962	253	14.9
1944	4,228	2,325	1,465	438	15.9
1945	3,865	2,106	1,475	284	11.8
1946	3,148	1,695	1,189	264	13.5
Totals	38,166	22,992	11,322	3,852	14.3

TABLE 37.—*National Board Examinations in Part II, 1922-1946*

Date	Total Examinations	Passed	Incomplete	Failed	Percentage Failed
February 1946	1,116	1,096	0	20	1.7
May 1946	323	319	0	4	1.2
December 1946	385	366	0	19	4.9
Totals	1,824	1,781	0	43	2.4
1922	109	90	0	19	17.4
1923	192	170	2	20	10.5
1924	267	227	0	40	15.0
1925	342	309	0	33	9.6
1926	381	334	1	46	12.1
1927	361	314	1	46	12.8
1928	410	371	1	38	9.3
1929	465	399	19	47	10.5
1930	620	543	7	70	11.4
1931	719	630	2	87	12.1
1932	732	674	0	58	7.9
1933	714	651	0	63	8.8
1934	633	583	0	50	7.9
1935	689	620	0	69	10.0
1936	768	716	2	50	6.5
1937	855	803	1	51	6.0
1938	861	815	0	46	5.3
1939	938	884	0	54	5.8
1940	1,028	963	9	56	5.5
1941	1,001	954	1	46	4.6
1942	1,072	1,031	0	41	3.8
1943	1,861	1,805	0	56	3.0
1944	1,405	1,350	0	55	3.9
1945	1,599	1,565	0	34	2.1
1946	1,824	1,781	0	43	2.4
Totals	19,846	18,582	46	1,218	6.2

During the year 1946, 3,148 examinations were given in part I; 1,695 passed and 264, or 13.5 per cent, failed. There were 1,189 incomplete examinations given. In calculating the percentage of failures these incomplete examination figures are excluded. In part II, 1,824 examinations were held; 1,781 passed and 43, or 2.4 per cent, failed. Incomplete examinations are only rarely given in part II. There were none given in 1946.

There have been 38,166 examinations given in part I since 1922 and 19,846 in part II. During this period 22,992 passed part I and 18,582 passed part II. In twenty-five years there have been 3,852 failures in part I, 14.3 per cent, and 1,218 failures in part II, 6.2 per cent. The wartime accelerated program in operation in all medical schools is evidenced by the increase in the number of candidates taking the examinations since 1942. The greatest number of examinations in part I were given in 1944 and in part II in 1943.

TABLE 38.—*National Board Examinations in Part III, 1922-1946*

	Total Examinations	Passed	Failed	Percentage Failed
1922	22	22	0	0.0
1923	82	81	1	1.2
1924	126	120	6	4.8
1925	219	206	13	5.9
1926	255	243	12	4.7
1927	293	272	21	7.2
1928	322	306	16	5.0
1929	352	337	15	4.3
1930	420	401	19	4.5
1931	437	419	18	4.1
1932	550	522	28	5.1
1933	551	526	25	4.5
1934	567	548	19	3.4
1935	598	578	20	3.3
1936	576	547	29	5.0
1937	668	630	38	5.7
1938	706	682	24	3.4
1939	770	729	41	5.3
1940	792	771	21	2.7
1941	910	885	25	2.7
1942	1,054	1,041	13	1.2
1943	1,230	1,213	17	1.4
1944	1,167	1,145	22	1.9
1945	1,244	1,231	13	1.0
1946	1,632	1,611	21	1.3
Totals	15,543	15,066	477	3.1

A candidate is eligible for part III who has passed parts I and II, received his M.D. degree and has satisfactorily completed an internship in a hospital approved by the Council on Medical Education and Hospitals of the American Medical Association or by the Canadian Medical Association or has served in a laboratory acceptable to the National Board. In 1946, 1,632 tests were given in part III; 1,611 passed and 21, 1.3 per cent, failed. Results of examinations given in this part in twenty-five years are given in table 38 and indicate that 15,543 were tested, of whom 15,066 were granted certificates. The percentage of failures in this part in twenty-five years was 3.1. Since the inception of the National Board in 1916, 15,334 certificates have been awarded.

Physicians who earn the certificate are designated diplomates of the National Board and are privileged to use the designating initials D.N.B.

The figures thus far presented represent examinations given. The number of individuals tested during any

one year is recorded for the twenty-five year period in table 39. The classification as "Passed" or "Failed" in cases in which more than one examination has been taken in a given year was based on the results of the last examination during the year in question. For example, if in 1946 a candidate passed part I but later in 1946 failed part II he is computed in the tabulation as having failed. On this basis figures computed indicate that there were 5,912 who took at least one of the tests of the National Board in 1946, as compared with 525 in 1922. The trend has been steadily upward. Last year the number of candidates was 298 greater than in the previous year, which exceeded the 1944 figure by 549. In all, 65,498 individuals were examined in one or more of the annual examinations in the twenty-five years shown, of whom 51,759 passed, 9,059 took incomplete examinations and 4,680, or 8.3 per cent, failed.

TABLE 39.—*Parts I, II and III, Excluding Duplications, 1922-1946*

	Total Examined	Passed	Incomplete	Failed	Percentage Failed
1922	525	381	58	86	18.4
1923	775	594	79	102	14.7
1924	978	756	69	153	16.8
1925	1,167	915	50	202	18.1
1926	1,161	930	105	126	11.9
1927	1,248	947	142	159	14.4
1928	1,430	1,101	211	118	9.7
1929	1,723	1,280	319	124	8.8
1930	2,044	1,547	322	175	10.2
1931	2,218	1,632	410	176	9.7
1932	2,342	1,850	355	137	6.9
1933	2,277	1,806	280	191	9.6
1934	2,261	1,801	330	130	6.7
1935	2,368	1,831	408	129	6.6
1936	2,517	1,989	353	175	8.1
1937	2,735	2,151	397	187	8.0
1938	2,998	2,308	498	191	7.6
1939	3,221	2,476	443	302	10.9
1940	3,188	2,597	363	228	8.1
1941	3,318	2,749	332	237	7.9
1942	3,607	3,014	391	202	6.3
1943	4,514	3,671	606	237	6.1
1944	5,363	4,235	750	369	8.0
1945	5,614	4,468	886	260	5.5
1946	5,912	4,730	898	284	5.7
Totals	65,498	51,759	9,059	4,680	8.3

The 1,611 physicians certified as diplomates in 1946 represented sixty existing medical schools and one extinct medical school in the United States, six in Canada and six foreign universities, as shown in table 40. A few of these foreign graduates were diplomates from medical schools in continental Europe who had registered before the National Board discontinued admitting graduates of these schools.

Diplomates licensed to practice medicine on the basis of their credentials increased from 2 in 1917 to 2,654 in 1946 and 12,682 have been so licensed since the National Board was formed. However, 15,066 have received the certificate of the board. It would appear that 2,384 have not used the credentials as a licensing medium. In 1946 diplomates were granted licenses to practice medicine on the basis of their credentials in 43 states, the District of Columbia, Hawaii and Puerto Rico. The number so registered in each state is reported in table 41.

The constitution of the National Board of Medical Examiners provides for a membership of thirty representing the federal services, the Federation of State Medical Boards of the United States, the Association of American Medical Colleges, the Council on Medical Education and Hospitals of the American Medical Association and members elected at large. The acting president of the board is Borden S. Veeder, M.D., the medical secretary, J. S. Rodman, M.D., and the executive secretary and treasurer, Mr. Everett S. Elwood. The address of the board is 225 South 15th Street, Philadelphia.

TABLE 40.—*Diplomates from Individual Medical Schools, 1946*

University of Arkansas	3	New York Medical College	93
College of Medical Evangelists	42	New York University	97
Stanford University	3	Syracuse University	28
University of California	1	University of Buffalo	77
University of Colorado	8	University of Rochester	42
Yale University	72	Duke University	78
George Washington University	74	Bowman-Gray School of Med	4
Georgetown University	45	University of Cincinnati	3
Howard University	8	Western Reserve University	1
Emory University	1	University of Oregon	4
Loyola University	6	Hahnemann, Philadelphia	9
Northwestern University	24	Jefferson Medical College	14
University of Chicago	4	Temple University	4
University of Illinois	10	University of Pennsylvania	20
Indiana University	7	University of Pittsburgh	3
State University of Iowa	28	Woman's Medical College	1
University of Louisville	11	Meharry Medical College	12
Louisiana State University	1	University of Tennessee	1
Tulane University	7	Vanderbilt Universtiy	7
Johns Hopkins University	14	University of Utah	2
University of Maryland	8	University of Vermont	25
Boston University	68	Medical College of Virginia	2
Harvard Medical School	145	University of Virginia	2
Tufts College Medical School	128	Marquette University	14
University of Michigan	6	University of Wisconsin	1
Wayne University	6	Dalhousie University	1
University of Minnesota	10	McGill University	20
St. Louis University	18	Unversity of Alberta	1
Washington University	5	University of Manitoba	1
Creighton University	9	University of Montreal	1
University of Nebraska	3	University of Toronto	1
Albany Medical College	34	Extinct medical schools	3
Columbia University	113	Foreign	7
Cornell University	38		
Long Island College of Med	63	Total	1,611

TABLE 41.—*Licenses Granted on the Basis of National Board Certificates, 1946*

Alabama	15	New Hampshire	51
Arizona	11	New Jersey	125
Arkansas	4	New Mexico	5
California	247	New York	754
Colorado	24	North Carolina	48
Connecticut	129	North Dakota	3
Delaware	1	Ohio	66
District of Columbia	106	Oklahoma	8
Georgia	20	Oregon	20
Idaho	3	Pennsylvania	63
Illinois	72	Rhode Island	25
Iowa	25	South Carolina	8
Kansas	20	South Dakota	2
Kentucky	10	Tennessee	8
Maine	28	Texas	39
Maryland	42	Utah	11
Massachusetts	374	Vermont	46
Michigan	33	Virginia	41
Minnesota	44	Washington	32
Mississippi	11	West Virginia	16
Missouri	30	Wyoming	2
Nebraska	7	Hawaii	11
Nevada	7	Puerto Rico	7
Total			2,654

EXAMINING BOARDS IN THE MEDICAL SPECIALTIES

The "Essentials for Approved Examining Boards in Specialties," originally published in THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION July 7, 1934, have been revised, particularly as they now refer to historical background, organization of boards, their operation and procedures for obtaining approval. This revision was officially approved by the House of Delegates of the American Medical Association on Dec. 9, 1946. These "Essentials" are as follows:

ESSENTIALS FOR APPROVED EXAMINING BOARDS IN SPECIALTIES

INTRODUCTION

The American Board of Ophthalmology, the first of the examining boards in the specialties, was incorporated in 1917. Four additional boards were organized by 1933 (Otolaryngology in 1924, Obstetrics and Gynecology in 1930, Dermatology and Syphilology in 1932 and Pediatrics in 1933).

In 1933 the House of Delegates of the American Medical Association adopted a resolution authorizing the Council on Medical Education and Hospitals "to express its approval of such special examining boards as conform to the standards of administration formulated by the Council" and providing for the employment of "the machinery of the American Medical Association, including the publication of its Directory, in furthering the work of such examining boards as may be accredited by the Council."

In 1933-1934 the Advisory Board for Medical Specialties was organized with representation from each of the approved boards to "act in an advisory capacity to such organizations as may seek its advice concerning the coordination of the education and certification of medical specialists." The Council on Medical Education and Hospitals and the Advisory Board for Medical Specialties work in close collaboration through joint meetings and frequent conferences.

PURPOSE AND FUNCTIONS OF A SPECIALTY BOARD

An American Board in a specialty is organized (*a*) to assist in improving the quality of graduate education in that field, (*b*) to establish minimum educational and training standards in the specialty, in conformity with the general provisions of these "Essentials," (*c*) to determine whether candidates have received adequate preparation as defined by the Board, (*d*) to provide comprehensive examinations to determine the ability and fitness of such candidates and (*e*) to certify to the competence of those physicians who have satisfied the requirements of the board, as a protection to the public and profession.

ORGANIZATION

An examining board in a specialty, to be approved by the Council on Medical Education and Hospitals, should represent a recognized and distinct specialty or well defined field of medicine. It should be composed of representatives of the national organizations in the field as well as the related section of the American Medical Association. The board should be incorporated.

DEFINITION OF SPECIAL FIELDS

The following branches of medicine at present are recognized as suitable fields for the certification of specialists. In each case the symbol employed in designating the specialists in the Directory of the American Medical Association is given (A.B. 1, and so on). Certain of the boards also certify candidates in subspecialties, as indicated by footnotes:

	Name of Board	Year of Incorporation
A.B. 1.	American Board of Pediatrics [1]	1933
A.B. 2.	American Board of Psychiatry and Neurology	1934
A.B. 3.	American Board of Orthopaedic Surgery	1934
A.B. 4.	American Board of Dermatology and Syphilology	1932
A.B. 5.	American Board of Radiology	1934
A.B. 6.	American Board of Urology	1935
A.B. 7.	American Board of Obstetrics and Gynecology	1930
A.B. 8.	American Board of Internal Medicine [2]	1936
A.B. 9.	American Board of Pathology	1936
A.B. 10.	American Board of Ophthalmology	1917
A.B. 11.	American Board of Otolaryngology	1924
A.B. 12.	American Board of Surgery [3]	1937
A.B. 13.	American Board of Anesthesiology	1938
A.B. 14.	American Board of Plastic Surgery	1937
A.B. 15.	American Board of Neurological Surgery	1940

1. Also certifies specialists in allergy.
2. Also certifies specialists in allergy, cardiovascular disease, gastroenterology and tuberculosis.
3. Also certifies specialists in proctology.

QUALIFICATIONS OF CANDIDATES

Each applicant for admission to the examination should be required to present evidence that he has met the following standard:

A. General Qualifications.

1. Satisfactory moral and ethical standing in the profession.
2. A license to practice medicine in a state, territory or possession of the United States.

B. Professional Education.

1. Graduation from a medical school of the United States or Canada approved by the Council on Medical Education and Hospitals of the American Medical Association. Candidates who submit credentials from institutions outside of the United States and Canada should be required to pass the examination of the National Board of Medical Examiners.
2. Completion of an internship of not less than one year in a hospital approved by the same Council.

C. Special Training.

1. A period of special training after the internship, preferably three years, in clinics, dispensaries, hospitals or laboratories approved by the Council on Medical Education and Hospitals and the respective specialty board as competent to provide a satisfactory training in the special field of study. In individual instances specialty boards may grant training credit for work done in preceptorships. Candidates whose special training has been received outside of the United States should submit credentials satisfactory to the examining boards. Credits for military service may be granted by individual boards.
2. This specialized training preparation shall likewise:
   (*a*) include satisfactory graduate training in the basic sciences which is considered by the American Board necessary to the proper understanding of the specialty in question;
   (*b*) be supplemented by an additional period of not less than two years of training and/or practice in the special field concerned;
   (*c*) be evaluated by examinations which should include the basic medical sciences as well as the clinical, laboratory and public health aspects of the specialty.

ESTABLISHMENT OF AN ACCEPTABLE SPECIALTY BOARD

In considering the organization of an American Board in a special field of medicine seeking recognition by the Council on Medical Education and Hospitals of the American Medical Association the procedure is as follows:

A. The application should be presented to the Advisory Board for Medical Specialties. This board in turn shall fully inform the Council on Medical Education and Hospitals regarding the application.

B. The application after being received from the Advisory Board for Medical Specialties will carefully be deliberated by the Council, due consideration being given to the need for a new board, the relationship of that board to the existing boards and the adequacy of the proposed educational programs and available facilities for the preparation of physicians for the certification examinations.

C. The Council will approve new boards only after recommendation by the Advisory Board for Medical Specialties.

D. Official recognition of the board is indicated by listing the specialty in the "Essentials for Approved Examining Boards in Specialties" and indicating certified specialists with an appropriate symbol in the Directory of the American Medical Association.

RESIDENCIES IN THE SPECIALTIES

Procedures for considering an institution for approval of a residency for training in a recognized specialty are as follows:

A. The institution should make application to the Council on Medical Education and Hospitals of the American Medical Association, 535 North Dearborn Street, Chicago 10, Illinois.

B. The Council conducts a survey of the institution to determine whether the residency complies with the Council's "Essentials of Approved Residencies and Fellowships."

C. The Council prepares a report on its findings and conclusions which is submitted to the specialty board concerned for its recommendations.

D. Approval may then be granted by the Council.

WITHDRAWAL OF APPROVAL

On conference with the respective specialty boards or with the Advisory Board for Medical Specialties, the recognition extended by the Council on Medical Education and Hospitals of the American Medical Association to holders of certificates from special examining boards, or that granted to a specialty board, may be withdrawn. Approval may likewise be withdrawn from institutions offering residencies when resurveys by the Council reveal a failure of the institution to maintain a satisfactory educational program.

Each specialty board publishes a booklet containing information regarding its organization, personnel, purposes and requirements for certification. A statement of these requirements for each board was published in the Educational Number of THE JOURNAL in 1942.[4] Only a few minor changes have been made by some of the boards since these regulations were published in 1942.

In 1946 three boards certified candidates in subspecialties. The American Board of Internal Medicine certified in allergy, cardiovascular disease, gastroenterology and pulmonary diseases (formerly called tuberculosis). Similarly the American Board of Surgery certified specialists in proctology. The American Board of Pediatrics has developed procedures for certifying pediatricians in allergy and certified five physicians to date. Regular board certification is a prerequisite for certification in the subspecialty. This function of these boards in internal medicine, surgery and pediatrics certifying specialists in the subspecialties is also approved by the Council.

There has been some misunderstanding regarding the status of the so-called subspecialties of proctology (in surgery), cardiovascular diseases, gastroenterology, tuberculosis (in medicine) and allergy (in medicine and pediatrics). These subspecialties are fully recognized by the Council on Medical Education and Hospitals of the American Medical Association. As such they are appropriate fields in which to organize residency training when the facilities warrant. Approved training programs will be listed under these headings in the Council's official list of approved residencies whenever the subspecialty board so desires.

The majority of the boards grant some credit for military service. The policies adopted by the boards vary. One board grants an indefinite amount of credit, to be determined by an evaluation of the experience of individual applicants. The board in surgery grants full credit for work done in the surgical division of a regularly constituted army or navy hospital. Most boards limit the credit allowed to one year of training and/or one year of experience. The special provisions for military credit made by each board were published in the 1943 Educational Number of THE JOURNAL.[5] Medical officers who did not keep an account of work done in military service in the booklet entitled "Record of Professional Assignments for Prospective Applicants for Certification by Specialty Boards" provided by the boards may now submit a duly certified statement of their military service as a part of the credentials to be submitted on application for the certification examination.

Because of the large number of applications for approval of residency training programs submitted by hospitals developing these programs in response to the increased demand for training by returning medical officers, the Council on Medical Education and Hospitals of the American Medical Association in February 1946 approved a plan for the temporary approval of residencies. This plan was developed in collaboration with the Advisory Board for Medical Specialties through its executive committee. The efforts of the Council, hospitals and medical schools have resulted in providing residency positions in civilian hospitals for 10,422 physicians as of March 1, 1947 as compared with 5,256 in 1941. In the course of the calendar year 1946 there were 511 residency services approved on a temporary basis. Of these services nearly 40 per cent have subsequently been given permanent approval on the basis of surveys of the hospitals providing the residencies. It is anticipated by the Council that the temporary approval of residencies might soon be discontinued.

Eleven boards recognize training with a qualified preceptor as a substitute for special clinical training. The policies of the boards toward the acceptance of such training are briefly outlined in table 42. The time credit allowed varies but in all instances is decided on an individual basis. The individual facilities and teacher qualifications of the preceptor must be approved by the respective board. This type of training is not accepted by four boards. The American Board of

TABLE 42.—*Specialty Board Credit for Preceptorship Training*

	Credit Awarded	Preceptors Limitations: Any Certified Board Member	Preceptors Limitations: Other Than Certified Board Member	Preceptors Limitations: List of Preceptors Maintained	Maximum Clinical Training Credit
Anesthesiology	Yes	No[2]	Yes (rarely)[2]	No	2 years
Dermatology and syphilology	Yes	No[2]	No	Yes	[3]
Internal medicine	No[1]	....	....	...	.....
Neurologic surgery	Yes	No[2]	No	No	No limit set
Obstetrics and gynecology	Yes	Yes	Yes[2]	No	Aver. 6 mo. per year of service
Ophthalmology	Yes	No[2]	Yes[2]	No	No limit set
Orthopedic surgery	Yes	Yes	No	No	3 years
Otolaryngology	Yes	Yes	Yes[2]	No	5 years[6]
Pathology	No	....	....	...	.....
Pediatrics	No	....	....	...	.....
Plastic surgery	Yes	Yes	No	No	Full credit
Psychiatry and neurology	No	....	....	...	.....
Radiology	No	....	....	...	.....
Surgery	Yes	Yes[3]	No	No	2 years
Urology	Yes	Yes[4]	No	No	3 years

1. All preceptorships now recognized by the board to be discontinued July 1, 1947. No new preceptors to be appointed.
2. Facilities and teacher qualifications must be approved by board.
3. Institution must be approved for graduate training.
4. Board member must certify training facilities are adequate and must certify at end of training period that candidate has had adequate training.
5. Two years, half time, one half of each day being spent in an approved institution; or one year full time in the preceptor's office in localities where approved institutions are not available.
6. Six years required after July 1950.

TABLE 43.—*Annual Specialty Board Certifications Since 1940*

Year (Ended March)	Number of Boards in Existence	Number Certified That Year	Accumulated Totals
1940	14	.....	15,853
1941	15	2,085	17,938
1942	15	1,756	19,694
1943	15	2,172	21,866
1944	15	1,578	23,444
1945	15	1,308	24,752
1946	15	1,320	26,072
1947	15	2,404	28,476

4. J. A. M. A. **119**: 1345 (Aug. 15) 1942.
5. J. A. M. A. **122**: 1085 (Aug. 14) 1943.

Internal Medicine has recently ruled that all preceptorships will be discontinued as of July 1, 1947 and no new preceptors will be appointed. Only four of the boards will give consideration to preceptor training carried out under a qualified specialist who is not himself certified by the appropriate board. One board maintains a list of preceptors.

Table 43 gives the annual number of specialists certified by all boards for the past seven years and the accumulated totals. The largest number (2,404) obtained certificates in the period from March 1, 1946 to March 1, 1947. Of all those physicians now certified, 12,623 (44 per cent) received their specialty credentials in the past seven years.

A list of the specialty boards, their officers and the number of certificates awarded prior to March 1, 1946 and the number certified to March 1, 1947 respectively appear in table 44. On March 1, 1946 there were 26,072 physicians certified by the fifteen boards, and in the year ended March 1, 1947, 2,404 were certified. Up to this date a total of 28,476 had been certified.

Included in the 28,476 certified in major specialties are 882 who were also certified in subspecialties by the boards in internal medicine, pediatrics and surgery as follows:

Internal Medicine	
Allergy	95
Cardiovascular Disease	361
Gastroenterology	183
Pulmonary Diseases (formerly called "Tuberculosis")	163
Pediatrics	
Allergy	5
Surgery	
Proctology	75
Total	882

The greatest number in any one specialty were certified in internal medicine: 4,449 to March 1, 1947. Of this number 543 were certified in the past year. During the past year also 445 were certified by the board in psychiatry and neurology, bringing the total certified by this board to 2,438. Significant increases in the last year were also noted in surgery (284), obstetrics and gynecology (172), radiology (168) and pediatrics (152). Neurological surgery certified twenty and plastic surgery eight. The oldest board in existence, ophthalmology (organized in 1917) certified 74 last year, bringing the total certified to date as 2,564. Heretofore the greatest number certified in any one specialty was in otolaryngology. In this specialty 3,988 have received the board's certificate since its organization in 1924.

A key number has been assigned to each approved board, such as A.B. 1, and the biographic records of physicians published in the American Medical Directory includes by these means reference to those certified.

The second volume of the "Directory of Medical Specialists," compiled by the Advisory Board for Medical Specialties, was published in 1946. This directory coordinates the work of the several specialty boards by combining in one volume the details of the activities of all boards with lists of their diplomates, including biographic information and data pertaining to the graduate educational background of each of the specialists certified by an American board. This volume lists 24,028 specialists certified prior to November 1945 by the fifteen American Boards and represents only those living at the time of publication but includes many who have retired from active practice.

TABLE 44.—*Approved Examining Boards in Medical Specialties*

Key No.	Name of Board	Year of Incorporation	Total Certificates Awarded to March 1, 1946	Total Certificates Awarded to March 1 1947
A.B. 1.	American Board of Pediatrics..... Pres., C. Anderson Aldrich, 102 Second Ave. S.W., Rochester, Minn. Sec., Lee F. Hill, 718 Royal Union Bldg., 7th and Grand Blvd., Des Moines, Iowa	1933	2,420	2,572
A.B. 2.	American Board of Psychiatry and Neurology ..... Pres., Walter Freeman, 2014 R St. N.W., Washington 9, D. C. Sec., F. J. Braceland, 102-110 Second Ave. S.W., Rochester, Minn.	1934	1,993	2,438
A.B. 3.	American Board of Orthopaedic Surgery ..... Pres., Guy A. Caldwell, 3503 Prytania St., New Orleans Sec., F. M. McKeever, 1136 W. 6th St., Los Angeles 14	1934	940	1,042
A.B. 4.	American Board of Dermatology and Syphilology ..... Pres., Francis E. Senear, 55 E. Washington St., Chicago Sec., George M. Lewis, 66 E. 66th St., New York City	1932	733	844
A.B. 5.	American Board of Radiology..... Pres., J. W. Pierson, 1107 St. Paul St., Baltimore Sec., B. R. Kirklin, 102-110 Second Ave. S.W., Rochester, Minn.	1934	2,198	2,366
A.B. 6.	American Board of Urology..... Pres., Gilbert J. Thomas, 1409 Willow St., Minneapolis Sec., Harry Culver, 1409 Willow St., Minneapolis	1935	1,050	1,136
A.B. 7.	American Board of Obstetrics and Gynecology ..... Pres., Walter T. Dannreuther, 580 Park Ave., New York City Sec., Paul Titus, 1015 Highland Bldg., Pittsburgh 6	1930	1,965	2,137
A. B. 8.	American Board of Internal Medicine Chairman, James J. Waring, 4200 E. 9th Ave., Denver 7 Sec.-Treas., Hugh J. Morgan, Vanderbilt University Hospital, Nashville, Tenn. Asst. Sec., William A. Werrell, 1 West Main St., Madison 3, Wis.	1936	3,906	4,449
A.B. 9.	American Board of Pathology..... Pres., N. C. Foot, 525 E. 68th St., New York Sec., Robert A. Moore, Washington University School of Medicine, St. Louis 10.	1936	1,240	1,339
A.B. 10.	American Board of Ophthalmology.. Chairman, Everett L. Goar, 1300 Walker Ave., Houston, Texas Sec., S. Judd Beach, 56 Ivie Rd., Cape Cottage, Maine	1917	2,490	2,564
A.B. 11.	American Board of Otolaryngology. Pres., Harris P. Mosher, 127 Front St., Marblehead, Mass. Sec., Dean M. Lierle, University Hospital, Iowa City	1924	3,886	3,988
A.B. 12.	American Board of Surgery..... Chairman, Vernon C. David, 30 E. Madison St., Chicago Sec., J. Stewart Rodman, 225 S. 15th St., Philadelphia	1937	2,620	2,904
A.B. 13.	American Board of Anesthesiology.. Sec., Paul M. Wood, 131 Riverside Dr., New York City 24	1938	278	316
A.B. 14.	American Board of Plastic Surgery Chairman, James Barrett Brown, 508 N. Grand Blvd., St. Louis 3 Sec., Robert H. Ivy, c/o Clerical Secretary, 4647 Pershing Ave., St. Louis 8.	1937	163	171
A.B. 15.	American Board of Neurological Surgery ..... Chairman, Howard C. Naffziger, 384 Post St., San Francisco Sec., Paul C. Bucy, 912 S. Wood St., Chicago 12.	1940	170	190
	Totals		26,072	28,476

Advisory Board for Medical Specialties

Pres., Robin C. Buerki, University of Pennsylvania Graduate School of Medicine, Philadelphia

Sec., B. R. Kirklin, 102-110 Second Ave. S.W., Rochester, Minn.

Certification in the subspecialties: By the American Board of Internal Medicine: allergy 95, cardiovascular disease 361, gastroenterology 183, pulmonary diseases (called "tuberculosis" until Feb. 1947) 163. By the American Board of Pediatrics: allergy 5. By the American Board of Surgery: proctology 75. Total certified in the subspecialties, 882. These figures are included in the foregoing tabulation.

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SATURDAY, MAY 17, 1947

MEDICAL LICENSURE

When Dr. Arthur Dean Bevan retired from the chairmanship of the Council on Medical Education and Hospitals of the American Medical Association more than twenty years ago he wisely emphasized that the accomplishments of the Council depended in large measure on its cooperation with other agencies and organizations that seek to improve medical education and the quality of medical care. The collaboration of the Council with the medical licensing agencies is typical of this philosophy. The publication of licensure statistics has figured prominently in the improvement of medical education in this country for over four decades. In this issue are presented the data on licensure for the year 1946, made possible by the conscientious reporting of examination and reciprocity actions of every governmental unit of the United States, its territories and its possessions, as well as the boards of examiners in the basic medical sciences, the National Board of Medical Examiners and each examining board in the medical specialties.

The candidates for licensure in the United States whose examination results are reported represented sixty-nine approved medical schools in the United States, nine approved medical schools of Canada, eighty-six faculties of medicine and four licensing corporations of other countries, eight medical schools now extinct, six unapproved institutions and seven colleges of osteopathy.

During the year 1946 there were 16,129 licenses issued, 6,559 after examination and 9,570 by reciprocity and endorsement. These figures represent an unprecedented increase over all previous years in both groups. Of those licensed, 6,959 represented real additions to the profession in this country, since many previously held licenses elsewhere. The number of physicians lost by death and emigration was 3,358, so that in 1946 the physician population in the United States was increased by 3,601.

Never before have there been anywhere near as many licenses issued by reciprocity and endorsement as in the past year. This is probably because unprecedented numbers of physicians are seeking new locations after the disrupting influence of the war.

Failures of candidates in various categories in examinations given by state licensing boards followed the familiar pattern. Only 3.1 per cent of graduates of existing approved medical schools failed. On the other hand, 41.6 per cent of those from unapproved schools failed and 55.5 per cent of the graduates of schools outside the United States and Canada did not pass.

Reprints of this report and of separate tables, in demand from numerous sources, will be available on request as one of the services rendered by the Council in replying to the thousands of annual requests for information on licensure.

METOPON HYDROCHLORIDE

In 1929 with funds provided by the Rockefeller Foundation the National Research Council, through its Committee on Drug Addiction, established a coordinated program to study drug addiction and to search for a nonaddicting pain-relieving drug comparable to morphine. The principal participating organizations were the Universities of Virginia and Michigan, the United States Public Health Service, the Treasury Department's Bureau of Narcotics and the health department of the state of Massachusetts. These agencies brought together chemical, pharmacologic and clinical facilities for the purposes of the study. Now a new morphine derivative—metopon hydrochloride (methyldihydromorphinone hydrochloride), one of many compounds made and studied in this coordinated effort—will soon be available.

Chemically metopon is a morphine derivative; pharmacologically it is qualitatively like morphine even to the properties of tolerance and addiction liability. Chemically metopon differs from morphine in three particulars: one double bond of the phenanthrene nucleus has been reduced by hydrogenation, the alcoholic hydroxyl has been replaced by oxygen and a new substituent, a methyl group, has been attached to the phenanthrene nucleus. Studies made thus far indicate that pharmacologically metopon differs from morphine quantitatively in all its important actions—its analgesic effectiveness is at least double and its duration of action is about equal to that of morphine; it is nearly devoid of emetic action; tolerance to it appears to develop more slowly and to disappear more quickly and physical dependence builds up more slowly than with morphine; therapeutic analgesic doses produce little or no respiratory depression and much less mental dulness than does morphine, and it is relatively highly effective by oral administration.

In addition to animal experiments these differences have been established by extensive employment of the drug in two types of patients: people addicted to morphine and others (patients dying of cancer) needing prolonged relief from pain but without previous experience with opiates. In morphine addicts metopon appears only partially to prevent the impending signs of physical and psychic dependence. When the drug is administered orally to patients with incurable cancer it gives adequate relief from pain with little mental dulling, without nausea or vomiting and with slow development of tolerance and dependence.

The high analgesic effectiveness of oral doses (with the elimination of the disadvantage to the patient of hypodermic injection), the absence of nausea and vomiting even in patients who vomit with morphine or other derivatives, the absence of mental dulness and the slow development of tolerance and dependence place metopon in a class by itself for the treatment of the chronic suffering of cancer. It is for that purpose exclusively that it is being manufactured and marketed.

Metopon will be available only in capsule form for oral administration. The capsules will be put up in bottles of 100, and each capsule will contain 3 mg. of metopon hydrochloride. They can be obtained by physicians only from Sharp & Dohme or Parke, Davis & Co. on a regular official narcotic order form, which must be accompanied with a signed statement supplying information as to the number of patients to be treated and the diagnosis on each. The drug will be distributed for no other purpose than oral administration for chronic relief of pain in cases of cancer.

The dose of metopon hydrochloride is 6 to 9 mg. (two or three capsules), to be repeated only on recurrence of pain, avoiding regular by-the-clock administration. As with morphine, the dose should be kept at the lowest level compatible with adequate relief of pain. Therefore, administration should be started with two capsules per dose, increasing to three only if the analgesic effect is insufficient.

Tolerance to any narcotic drug develops more rapidly with excessive dosage and under regular by-the-clock administration. Also, as a rule, the pain of cancer varies widely in intensity from time to time. Pain, therefore, should be the only guide to time of administration and level of dosage. Tolerance to metopon hydrochloride develops slowly; it can be delayed or interrupted entirely by withholding the drug occasionally for twelve hours or for as much of that period as the incidence of pain will permit.

To each physician will be sent a record card for each patient to whom metopon hydrochloride is to be administered. He will be requested to fill out these cards and return them in the addressed return envelop. He must furnish this record of his patient and his use of metopon hydrochloride if he wishes to repeat his order for the drug. The principal object of this detailed report is to check the satisfactoriness of metopon hydrochloride administration in general practice. The physician's cooperation in making it as complete as possible is earnestly solicited.

The limited use of metopon hydrochloride as here described has been recommended by the Drug Addiction Committee of the National Research Council; this committee, with the cooperation of the American Cancer Society, will supervise the distribution of the drug. The committee is composed of William Charles White, Chairman, Washington, D. C.; H. J. Anslinger, Commissioner of Narcotics, United States Treasury Department, Washington, D. C.; Lyndon F. Small, National Institute of Health, Washington, D. C., and Nathan B. Eddy, National Institute of Health, Washington, D. C.[1]

THE TEACHING OF NUTRITION—IV

Until recently consideration of dietary problems in relation to surgical patients has been of relatively small importance. Quantitative rather than qualitative problems were of chief concern. When to give food to patients after gastric operations or peritonitis was the type of nutritional problem that interested the surgeon. A real knowledge of dietetics was not needed to solve such problems, if they were solved. Actually, true quantitative thinking concerning the problem was seldom if ever done. Measurements were not used, but expressions such as "give the patient a 'light' soft solid diet." Medical consultants were asked for advice when any problems more complicated than these appeared.

Recently, however, nutrition has been found so important in the recovery of patients with various "surgical" diseases that the surgeon himself has been forced to pay more and more attention to the diets and dietary supplements, such as vitamins, that are given his patients. This is especially true since intravenous alimentation with protein digests, plasma and vitamins has been made available to complicate the former rather simple routines for early postoperative care that existed ten years ago. Then the only fluids given intravenously were saline solution, glucose and whole blood.

Infections and injuries (and the latter include major surgical operations) produce rapid wastage of protein tissues and of stores of vitamins and minerals. A fair percentage of the patients also suffer from deficiencies of protein and various vitamins and minerals before their injury. Severe infection or injury may result in early nutritional disturbance in the healthy patient, while slight infection or injury may have the same result in the man already depleted.

So far as is known, formal, systematic teaching of the nutrition of surgical patients is done in few medical schools or hospitals. Although it is not easy to find the time for anything new in any curriculum, the small amount of time necessary should be found.

1. Queries and comments on metopon may be directed to Dr. Eddy, who will answer them for the committee.

Formal lectures can do little more than create an interest in the subject. Detailed work on individual patients with responsibility for diets is needed, together with close observation of the patient's response to the food and other nutrients ordered. Exercises should be held with small sections of students who are working actively and constantly with the patients. Besides the instructor, residents, interns, students and, above all, a trained dietitian should make up the study group. First, the members of the group must think in terms of the amounts of protein, vitamins, minerals and calories their patient needs to maintain his strength and to replace at the optimum rate any past deficits. Second, they must learn to think of food in terms of the carbohydrate, protein, fat, vitamins and minerals the food contains and the number of calories it furnishes. Third, they must estimate, with the aid of the dietitian, how closely it is practical for them to try to balance intake against probable utilization and need.

The ground that could be covered by such a study group is much greater than the time that could possibly be allotted to it. However, some of the most important subjects that should be kept in mind are the relationships of protein, vitamins and anemia to surgical shock; the loss of protein and sodium chloride in pus and other excretions; loss of weight after surgery and its prevention; the relative importance of technical errors, distention, plasma protein deficiency and ascorbic acid deficiency in wound disruption or in poor wound healing; differences between the amounts and kinds of food ordered and the foods presented to the patients; differences between the amounts and kind of food presented to the patients and the foods eaten; differences between the amounts and kinds of food eaten and the foods actually absorbed from the intestine; the food values in the various diets consumed and how they may be calculated; how a diet containing 400 Gm. of protein and furnishing 4,000 calories can be given to a very sick patient, and what vitamins, minerals, protein and calories are needed each day by the patient with chronic ulcerative colitis or with an extensive unhealed burn at the end of three weeks.

Suggested answers to these questions may be easily available, but how often are the questions asked or discussed in active surgical services?

Such a study group could pay some attention to the costs of the various diets and supplements ordered. In general all doctors try to find ways and means of securing for their patients any necessary treatment regardless of cost. However, especially in nutrition, there are times when less costly materials are as good as or better than costly ones. For instance, if plasma is used intravenously purely to furnish protein, it costs at least $1 per gram of protein. Suitable digests for intravenous use furnish protein equivalent at less than 10 cents per gram and are often safer to give to the depleted patient because they do not contain the large amount of sodium that plasma does. When it comes to oral feeding hamburger steak at 40 cents a pound furnishes protein at one-half cent a gram. But skim milk powder at $16 a hundred pounds furnishes protein at 1 mill per gram, and with it one gets a large quantity of sugar and certain vitamins free. When a patient is seriously depleted of protein and has a deficit of many kilograms, plasma is useless for intravenous feeding and skim milk and skim milk powder are better than steak for oral feeding! This is true not only because of the price but also because so much more can be taken by the patient in a given time. These are some of the most important elementary lessons of nutrition that surgeons should study and learn.

Current Comment

GAMMA GLOBULIN VS. THE COMMON COLD

Clinical evidence that human serum globulin contains antibodies against common respiratory diseases presumably caused by unknown pneumotropic viruses is offered by Adams and Smith [1] of the Department of Pediatrics, University of Minnesota. Medical students were selected for prophylactic tests. A careful history of their past experiences with acute respiratory infections was obtained. From these data they were divided into groups based on the previous frequency of the disease. One half of each group was selected for experimental study. In October an initial dose of 6 cc. of concentrated gamma globulin solution was administered intramuscularly to each student of the experimental group. Thereafter 4 cc. of the same solution was given at monthly intervals, most of the students receiving a total of 30 cc. in seven inoculations. The occurrence and severity of attacks of respiratory disease were determined at frequent intervals for each group. In the experimental groups, 77 episodes of acute respiratory disease were recorded during the academic year. There were 132 episodes in the nontreated group. In the experimental groups the diseases were classified as severe in 10 instances, moderate in 17 and mild in 49 cases. The previous season record of this group showed 28 severe attacks, 38 moderate and 46 mild. In the nontreated group the number and severity of the attacks were identical with those of the previous year. From these data the conclusions are that human gamma serum globulin given in the arbitrarily selected doses reduces the incidence of attacks of acute respiratory disease by about 40 per cent, with a parallel reduction in the severity of individual cases. Whether or not the effective antibodies are specific or nonspecific for the corresponding viruses has not yet been determined. The presence of nonspecific virus inactivating substances in certain Brazilian species of marsupials and rodents has been recently reported by Koprowski [2] of the Rockefeller Foundation.

1. Adams, J. M., and Smith, N.: Proc. Soc. Exper. Biol. & Med. **63**: 446 (Nov.) 1946.
2. Koprowski, Hilary: J. Immunol. **54**: 387 (Dec.) 1946.

ORGANIZATION SECTION

World Medical Association

(NOTE.—*Following is a report by two members of the Board of Trustees covering recent attendance of a session of the World Medical Association.*—ED.)

The World Medical Association was proposed in September 1946 at a conference in London. It is the successor of the Association Professionelle Internationale des Médecins.

The purpose of the organization is to foster close relationships among the national medical associations of the world.

A second conference was held in London in November 1946, at which time a tentative draft of a constitution and by-laws was drawn up. An organizing committee of ten was appointed, comprising representatives from Belgium, Canada, Czechoslovakia, France, Great Britain, Egypt, Spain, Sweden, Switzerland and the United States. Dr. T. C. Routley of Canada was elected chairman of the organizing committee, and a joint secretariat was appointed, consisting of the secretary of the British Medical Association, Dr. Charles Hill, and the secretary of the French Medical Association, Dr. P. Cibrie. Dr. O. Leuch of Switzerland was designated treasurer.

The tentative draft of the constitution and by-laws was circulated among the members of the organizing committee for study and comment. It served as the basis of the agenda for the two day meeting held in London at the British Medical Association House on April 14 and 15, 1947.

At this meeting a final draft of the constitution and by-laws was agreed on, and this is to be submitted to the first plenary session of the association for ratification. This session will be held in Paris Sept. 16 to 20, 1947.

The object of the association, in pursuit of which it shall use every means available to it, are:

1. To promote closer ties among the national medical organizations and among the doctors of the world by personal contact and all other means available.

2. To maintain the honor and protect the interests of the medical profession.

3. To study and report on the professional problems which confront the medical profession in the different countries.

4. To organize an exchange of information on matters of interest to the medical profession.

5. To establish relations with and to present the views of the medical profession to the World Health Organization, UNESCO and other appropriate bodies.

6. To assist all peoples of the world to attain the highest possible level of health.

The original draft had provided that the association could pass resolutions and make recommendations relative to the medical care situation in any country. The American representatives objected strenuously to this and it was deleted. We made no objections to factual reports but felt that no outside agency should make recommendations relative to our internal situation or the internal situation of any other country.

It was decided that the association should consist of a general assembly comprising two delegates from each participating association. Each association may also send observers in addition to the delegates. This general assembly shall have general control over the policy and affairs of the association. The officers are to be a president, a president-elect, a secretariat (which, as soon as possible, will consist of a single secretary on a paid full time basis with the necessary assistance) and a treasurer. The general assembly will meet once a year and, so far as possible, in a different country each year. The president-elect will be chosen from among the outstanding physicians of the country in which the next meeting is to be held.

A council is to be established, which will consist of the president, the president-elect, the treasurer and nine elective members, three of whom are to be elected each year for three years. The first year three are to be elected for three years, three for two years and three for one year. The council will meet just before and just after the general assembly and once in between the meetings of the assembly. It will carry out the resolutions of the assembly and administer its affairs in conformity with the constitution and by-laws. The council shall elect its own chairman.

English and French are the official languages, and translation is provided.

A journal is to be published at intervals yet to be decided. Articles may be published in either English or French, but official notices are to be published in both languages. The council is to nominate an editor of the journal, to be elected by the general assembly.

The constitution can be amended only after nine months' notice and by a two-thirds vote. The by-laws and resolutions pertaining to finance may be amended after four months' notice and by a majority vote. Referenda of the member associations are provided for on important changes of policy.

The dues of the association depend in part on the size of the member association. Each member association is to pay 10 Swiss centimes per member, but each association will pay at least 1,000 Swiss francs and no member association shall pay more than 10,000 Swiss francs. The council will have authority to reduce the assessment in appropriate circumstances.

This caused considerable discussion, as some members suggested a flat rate per member. This was objected to by us, as it would have resulted in our paying more than half of all the assessments. It was pointed out that the American Medical Association, although comprising over 130,000 members, receives no dues from its members and receives only the subscriptions for the publications subscribed for by its Fellows.

The aforementioned arrangement was then agreed on as a compromise.

There are now fifty-nine national medical organizations in the world. The national associations of the following countries are the founder associations of the World Medical Association: Austria, Australia, Belgium, Canada, Chile, Czechoslovakia, Denmark, Egypt, Eire, Finland, France, Great Britain, Greece, Hungary, Iceland, Iraq, Luxembourg, the Netherlands, New Zealand, Norway, Persia, Poland, Portugal, Spain, Sweden, South Africa, Switzerland, Turkey and the United States.

This new organization has great potentialities. It will afford a mode of rapprochement among the doctors of the world. With the present chaotic state of international affairs, it would seem that the doctors should have no difficulty in getting together as they have one common aim, expressed in the final item of the object of the association, "to assist all peoples of the world to attain the highest possible level of health."

After the draft of the constitution and by-laws had been completed, a tentative budget was authorized.

Dr. T. C. Routley was designated to represent the World Medical Association at the Centenary of the American Medical Association.

Dr. Routley reported that tentative arrangements had been made to distribute a book on nutrition, prepared by the American Medical Association, the Canadian Medical Association and the National Research Council of the United States, to all doctors of the world. The expense of printing is to be defrayed by the Mead Johnson Company.

A draft of a questionnaire to be sent to all national medical associations was approved and it has been sent out. The questionnaire is entitled "Enquiry into the Present Position of the Medical Profession and Its Relation to the State."

On the evening of April 14 the British Medical Association gave a dinner to the committee. It was presided over by Sir Hugh Lett, president of the British Medical Association.

Later in the week we were both privileged to inspect the work of two of the largest hospitals in London.

On the evening of April 17 we were entertained at the Athenaeum Club by Dr. Hugh Clegg, editor of the *British Medical Journal*. We had an opportunity to discuss the new British National Health Service Act with Sir Wilson Jameson, chief medical officer of the British Health Ministry, and Sir Allan Daly, chief medical officer of the London Hospital Council.

Respectfully submitted,

LOUIS H. BAUER, M.D.
ELMER L. HENDERSON, M.D.

Council on Medical Service

CASH SICKNESS BENEFITS FOR RAILROAD WORKERS

A cash sickness benefit system for railroad workers will begin operating throughout the nation on July 1. These benefits were added under the 1946 amendments to the Railroad Unemployment Insurance Act and provide partial compensation for wage loss due to disability on the same basis as that due to unemployment. The system will be administered by the Railroad Retirement Board, which administers the Railroad Unemployment Insurance Act.

All disabilities which prevent railroad employees from working, regardless of how or where they occur, are covered under the program. In the first year of operations, about 300,000 of the 2,075,000 railroad workers qualified are expected to receive benefits, and the total amount of benefits is expected to reach $36,000,000.

A physician's statement of sickness will be required before claims can be paid. It is believed that the program will require about 650,000 medical examinations a year. Employees are free to choose their own doctors, and any physician to whom an employee goes for examination or treatment may supply the information required as initial proof of an employee's claim.

The forms on which medical information will be requested from a physician are the "Statement of Sickness" and the "Supplemental Doctor's Statement." The first mentioned form is intended primarily to obtain information at the beginning of each illness, and the second is intended to obtain additional information only when such information is needed later on in the same illness. The statements are designed to furnish, as simply and as conveniently as possible for the physician, the minimum information required for board purposes.

The "Statement of Sickness" on which the medical evidence is to be furnished must be mailed to the appropriate office of the Railroad Retirement Board within seven days after the first day claimed as a day of sickness, or the employee may lose part of his benefits. Claims for succeeding fourteen day periods may be allowed for a predetermined period as indicated by the medical evidence on the doctor's initial statement, but in continuing illnesses supplemental information about the patient's illness may also be requested from the physician.

Claims will be filed and adjudicated in the regional offices of the Railroad Retirement Board. These offices are located in Atlanta, New York, Cleveland, Chicago, Dallas, Kansas City, Minneapolis, Denver and San Francisco and serve the adjoining territories. Each will have a physician who will act as a medical consultant. Additional information about the program may be obtained from any of the aforementioned offices.

Washington Letter

(From a Special Correspondent)

May 12, 1947.

Presidential Physician Reports Mr. Truman in Best of Health

Brig. Gen. Wallace Graham, presidential physician, announced that President Truman was in good health on his sixty-third birthday, May 8, although weighing 10 pounds more than he did when he took office. Mr. Truman rises around 5:30 a. m. daily and frequently takes long walks before breakfast. He usually naps for twenty or thirty minutes after luncheon and takes a plunge in the White House pool three times a week.

Bradley Pledges Battle for Veterans Administration Medical Program

Gen. Omar N. Bradley, Veterans Administrator, told his top lieutenants that he will cooperate with Congress in effecting economies but will oppose reductions that will mean a "waste of human resources." He declared that in no case would he permit a reduction in the quality of the Veterans Administration medical program, which he said had "advanced until today it ranks as the outstanding medical program in the world." Among the agency's accomplishments for the past twenty months he listed discharge of 685,000 patients from Veterans Administration hospitals, doubling rate of hospital patient turnover, addition of 23,000 hospital beds, 8,000,000 outpatient examinations, 6,000,000 outpatient treatments and the opening of 152 outpatient clinics and 31 clinics for mental hygiene.

War Department to Stress Medical Research

The War Department has announced that it will continue its program of military medicine research. Fundamental research will be vigorously continued in the field of chemistry, physiology, pathology and psychology in relation to extremely low temperatures. Development of prosthetic devices, including sensory devices, will be continued in conjunction with the National Research Council and the Veterans Administration. Research in the field of nutritonal, physiologic and psychologic studies of personnel in relation to environment will be continued. Research and collection of data in the field of pathology will be continued by the Army Institute of Pathology. Research will be continued in the field of preventive medicine, i. e. immunology, sanitation, malaria control, venereal disease control, insect and rodent control and respiratory and intestinal disease control methods. Projects will be continued in the broad field of medical and surgical practice, particularly for the development and study of new treatment methods, new therapeutic agents, traumatic surgery, chemotherapy and the treatment of shock. A program in wound ballistics will be carried out in cooperation with the Medical Department, the Ordnance Department and the Chemical Corps. Studies will be carried out to include new methods for use of present antibiotic agents as well as the development of entirely new agents. Fundamental research into the causes and prevention of psychoneurosis will be carried on. Research must be continued into special diseases not covered in the category of medical and surgical practice.

Bureau of Standards Builds Apparatus to Study Atomic Rays

The National Bureau of Standards announced that its scientists have built a "beta-ray spectrometer" to be used in resarch on about 400 radioactive isotopes. The equipment is designed for study of beta particles and gamma rays, some of which are poisonous to certain tissues, while others are said to be usable in both medical treatments and x-ray examination.

Federation of American Scientists

Dr. Robert Marshak, Rochester University physicist, was elected chairman of the Federation of American Scientists. Formerly with the Los Alamos, N. M., laboratory of the atomic bomb project, Dr. Marshak said that the federation would continue its fight for world control of atomic energy under international law and scientific freedom.

Bureau of Information

LOCATION OF PHYSICIANS

Virginia Shuler
Chicago

Demobilization is not completely over. Many young physicians are still in the armed forces, and a large proportion of the resident physicians doing postgraduate work in hospitals are men who served in World War II. According to the Directory Department of the American Medical Association, approximately five thousand physicians have not yet decided on a permanent location.

Already the Bureau of Information is sensing the trend of returned medical officers to move away from their recent venture in city practice to accept the opportunities of more active practice in smaller communities. From studies of physician distribution the general picture for location of physicians during the year following V-J day shows an adequate supply of physicians in most of the states but reflects a need for a more coordinated system of medical service in many of the rural areas.

Leaders of the medical profession interested in better rural medical service are working with the farm organizations to outline a program of activity to develop in rural areas an appreciation of modern medical service and the responsibility of the community in planning a health program that will make the country physician a working partner toward decentralization of medical care from urban or large trade centers to the more rural sections of the population. The medical profession and the farm groups want to make rural medical service more adequate not only to the farmer but also to those who extend this service to the farmer.

Dr. F. S. Crockett, Chairman of the Committee on Rural Medical Service of the American Medical Association, has recently announced that the Farm Bureau, the Farmers Union, the Cooperative Milk Producers' Federation and the Grange have each appointed two of their members to act in an advisory capacity to the Committee on Rural Medical Service of the American Medical Association. This committee will hold a meeting soon to outline and develop an active program for regional and local rural representatives. Thomas A. Hendricks, Secretary of the Council on Medical Service, is working out a plan with the Committee on Rural Medical Service to coordinate the Council's and the Committee's regional meetings in order to develop through workshop conferences the most adequate extension of medical service to all areas.

In December 1946 the Bureau of Information began a survey through the local medical societies to determine the conditions and distribution of medical care in the rural areas of the country. Through the cooperation of the secretaries of the state and county medical societies, listings of areas which have requested physicians are available to help the doctor in selecting an area in which to establish his medical practice.

This is the first of a series of charts showing the trend in locations of physicians from April 1946 to January 1947.

OHIO—1946

OHIO—1947

Population, based on 1943 estimated Census figures, per active physician (excludes teaching, research, hospital administration, public health and state hospitals) by county.

Key: Physician-population ratio by county: plain area 1-999, dotted area 1,000-1,499, striped area 1,500-2,999, checked area 3,000 and over, solid black area no doctor.

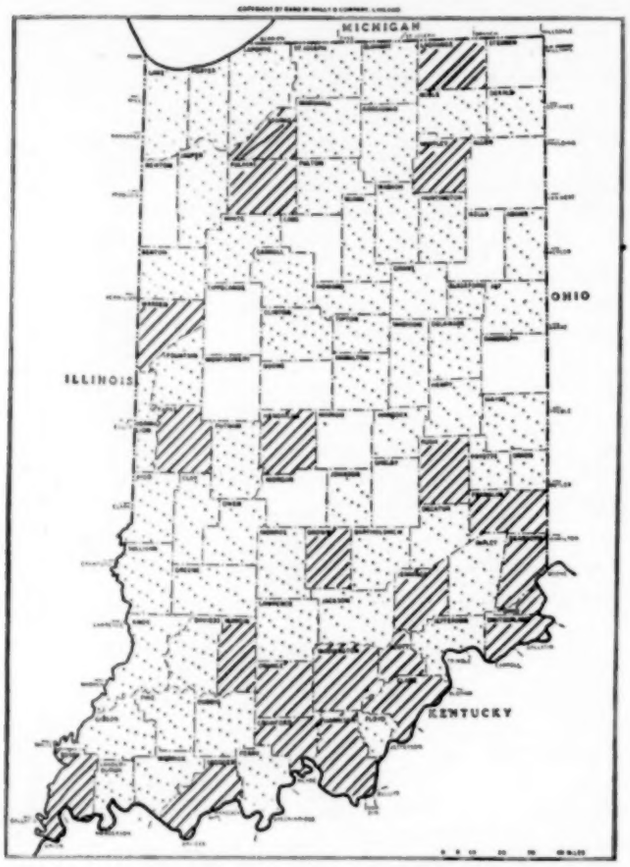
Areas in Ohio Requesting General Practitioners

County	Town	Population
Adams	Manchester	2,163
	Peebles	1,356
	Seaman	726
	Stout	169
	Winchester	798
Ashland	Nankin	250
	Savannah	358
	Sullivan	267
Ashtabula	Andover	945
	Pierpont	150
	Rock Creek	492
Athens	Aloany	551
	Amesville	286
	Chauncey	1,234
	New Marshfield	435
Auglaize	Cridersville	581
Champaign	Christianburg	600
	Mechanicsburg	1,653
	Spring Hill	121
	Woodstock	263
Clark		95,097
Clinton		22,574
	Clarksville	430
	Port William	1,000
Columbiana	Winona	185
Coshocton	Conesville	500
	Keene	150
	Warsaw	455
Crawford	Brokensward	100
	Lemert	62
	North Robinson	195
Darke	North Star	200
Erie	Berlin Heights	551
	Birmingham	250
	Kelleys Island	564
Fairfield	Carroll	337
	Stoutsville	509
Fayette	Jeffersonville	785
	Milledgeville	178
Fulton	Lyons	464
	Metamora	490
Franklin	Hilliards	583
Gallia		24,930
Green		35,863
Guernsey	Buffalo	584
	Kimbolton	214
	Lore City	1,200
	Pleasant City	563
Hancock	Vanlue	400
Hardin	Ada	2,368
	Forest	1,200
	Mount Victory	645
	Ridgeway	375
Henry	Deshler	1,570
Highland	Highland	262
	Sinking Spring	223
	Sugar Tree Ridge	76
Hocking	Carbon Hill	499
	Logan	6,177
	Murray City	1,000
	South Bloomingville	100
Holmes	Killbuck	716
Huron	Greenwich	996
Jackson		27,004
	Jackson	6,295
	Oak Hill	1,619
Jefferson	Bergholz	1,122
	Bloomingdale	339
	Knoxville	300
	Mount Pleasant	717
	Richmond	458
Knox	Centerburg	800
Lawrence	Coal Grove	2,351
	Pedro	30
	Rock Camp	58
	South Point	499
Licking	Croton	354
	Etna	300
	Hanover	325
	Hebron	723
	Johnstown	1,100
Logan	DeGraff	756
	Lewistown	250
	Quincy	536
	Rushsylvania	560
	Russels Point	554
	West Liberty	1,228
Lucas	Holland	607
Mahoning	Damascus	411
	New Springfield	320
	North Benton	250
	North Jackson	402
Marion	Green Camp	327
	Meeker	120
	Morral	398
Meigs	Chester	168
	Long Bottom	250
	Racine	490
	Reedsville	200
	Rutland	562
Mercer		26,256
	Mendon	547
Miami	Fletcher	436
	Laura	317
Monroe	Antioch	145
	Jerusalem	180
	Lewisville	252
	Malaga	100
Montgomery	Miamisourg	6,000
Morgan	Pennsville	200
	Reinersville	100
Morrow	Cardington	1,304
	Marengo	275
	Mount Gilead	2,008
Muskingum	Adamsville	175
	Adams Mill	155
	Nashport	150
	Trinway	432
Paulding	Oakwood	500
	Paulding	2,044
Pickaway	Tariton	274
Pike	Cynthiana	200
	Omega	150
	Wakefield	200
Portage	Hiram	389
	Windham	316
Preble	Eldorado	311
	New Paris	989
	West Manchester	395
Putnam	Cloverdale	185
	Fort Jennings	326
	Kalida	521
	Ottoville	443
Richland	Belleville	1,199
	Lexington	713
Ross	Frankfort	839
Scioto	Buena Vista	335
	Minford	200
	Otway	265
	Wheelersburg	1,500
Shelby	Jackson Center	600
	Pemberton	175
Stark	Beach City	812
	East Sparta	690
	Hartville	1,200
	Louisville	3,379
	Marlboro	255
	Paris	225
	Uniontown	600
	Wilmont	287
Summit	Peninsula Boston Heights	900
	Stow	2,500
Trumbull	Kinsman	600
Tuscarawas	Port Washington	493
Union	Milford Center	686
Vinton	Hamden	924
	McArthur	1,288
	Radcliffe	200
	Wilkesville	221
	Zaleski	374
Warren	Harveysburg	354
Washington	Barlow	195
Wayne	Dalton	774
	West Salem	700
Williams	Pioneer	762
	Runkle	296
	Williams Center	150
Wood	Bradner	836
	Cygnet	569
	Wayne	626
Wyandot	Nevada	741

"Conditions in Ohio are still somewhat abnormal. A considerable number of men returning from the service who would ordinarily have gone into private practice are at present engaged in postgraduate work. During the past year we have been successful in a good many instances in locating men in certain communities; nevertheless, we still have a rather extensive list of small areas needing a physician or where the population would like to have a physician or another physician. We are doing our best to get this information in the hands of those seeking locations, including Ohio physicians as well as physicians in other states. In my opinion this is a problem which will not be corrected in the immediate future and perhaps will take years to work out. Efforts are being made by this association, in cooperation with Ohio's three medical schools, to impress on graduates the need for physicians in rural areas and the advantages offered by such areas. On the other hand, we are endeavoring to list the so-called disadvantages of rural practice so that efforts can be made in an organized way to correct situations which cause these disadvantages. Until some of these situations are corrected, we cannot expect a much larger percentage of new graduates to locate in outlying areas."

MR. CHARLES S. NELSON, Executive Secretary,
Ohio State Medical Association,
1005 Hartman Theater Building,
Columbus 15, Ohio.

INDIANA—1946



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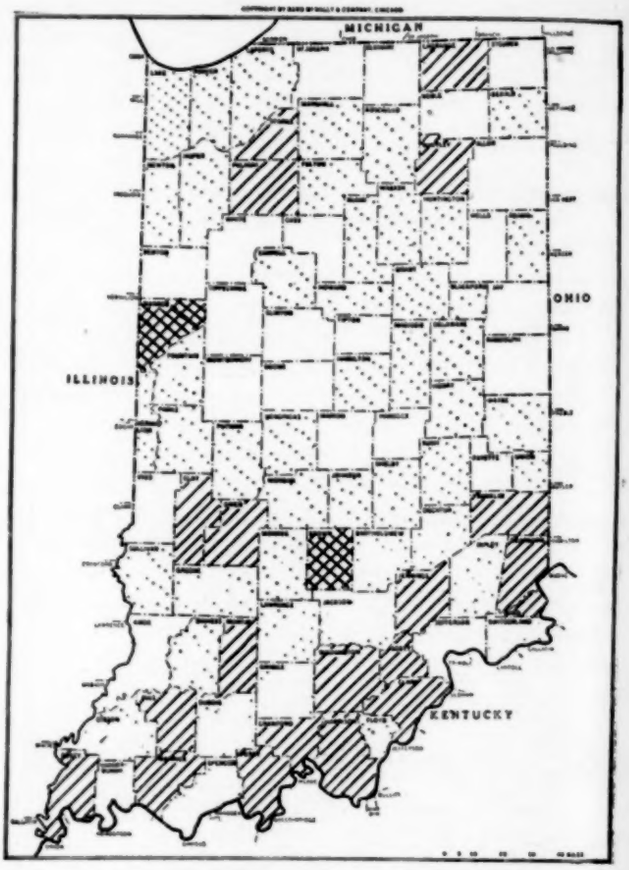


Population, based on 1943 estimated Census figures, per active physician (excludes teaching, research, hospital administration, public health and state hospitals) by county.

Key: Physician-population ratio by county: plain area 1-999, dotted area 1,000-1,499, striped area 1,500-2,999, checked area 3,000 and over, solid black area no doctor.

Areas in Indiana Requesting General Practitioners

County	Town	Population
Adams	Decatur	5,861
Bartholomew	Elizabethtown	319
	Hartsville	318
Carroll	Burlington	429
	Burrown	175
Clark	Borden	392
	New Washington	275
Clay		25,365
	Bowling Green	219
Clinton	Kirklin	712
	Mulberry	860
Daviess		26,163
	Plainville	619
Dearborn	Lawrenceburg	4,413
Decatur	Clarksburg	275
	Letts	200
	Millhousen	180
DeKalb	Spencerville	310
DuBois	Birdseye	370
Elkhart		72,634
	Elkhart	34,000
Floyd		35,061
Franklin	Laurel	583
Fulton	Kewanna	701
	Leiters Ford	200
Gibson		30,709
	Francisco	611
	Owensville	1,183
	Patoka	560
Harrison		17,106
	Palmyra	274
Hendricks	Amo	288
Huntington	Mt. Etna	139
Jackson	Crothersville	1,169
	Freetown	723
	Medora	722
Jennings		13,008
	Scipio	150
Knox	Bicknell	5,110
	Freelandville	695

County	Town	Population
Kosciusko	Mentone	731
	Warsaw	6,378
LaGrange		14,352
	Shipshewana	286
LaPorte	Westville	523
Martin		10,300
Miami	Bunker Hill	792
	Macy	275
Morgan	Martinsville	5,009
Newton	Brook	800
	Lake Village	250
	Morocco	1,151
Noble		22,776
Ohio		3,782
Perry	Bristow	102
Pike	Otwell	364
	Stendal	150
Posey	Griffin	386
	Mount Vernon	5,638
	Stewartsville	200
	Wadesville	200
Pulaski	Medaryville	703
Putnam	Cloverdale	657
Randolph	Winchester	5,303
Ripley		18,808
	Batesville	3,075
	Holton	300
Rush	Raleigh	150
Shelby	Marietta	150
	Morristown	665
Spencer		16,211
Steuben	Hamilton	395
Sullivan	Dugger	1,406
	Hymore	1,298
	Shelburn	1,606
Tippecanoe	Stockwell	500
Vermillion	Hillsdale	500
Wabash	North Manchester	3,170
White	Wolcott	747
Whitely	Churubusco	1,122
	Larwill	319
	South Whitely	1,118

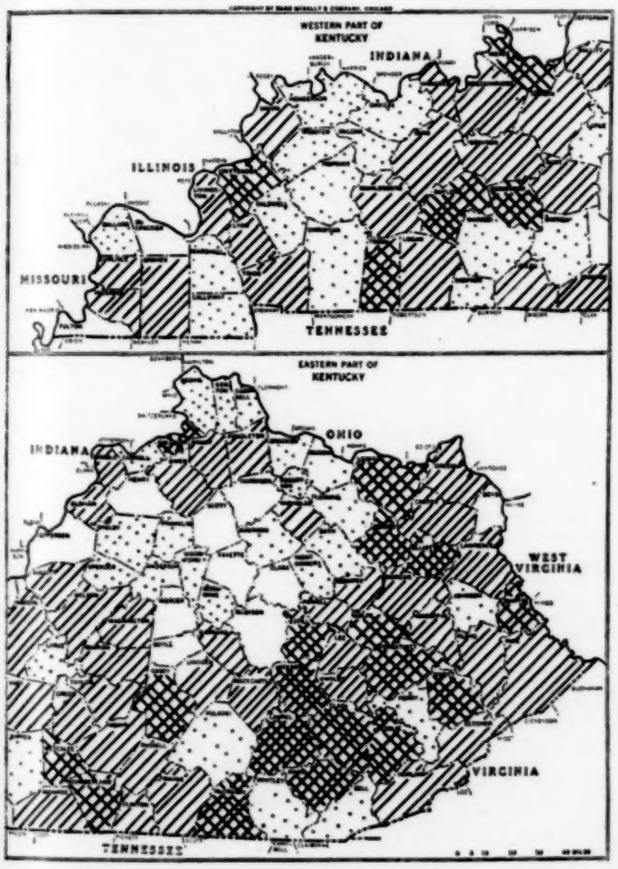
"With the exception of Lawrenceburg, a city of approximately 5,000 in the southeastern part of our state, all cities of any size in Indiana now have sufficient physicians. Lawrenceburg could use two doctors. The main industry is whisky distilling. Lawrenceburg does not have a hospital, but it is not more than 25 miles from Cincinnati. One of the problems a doctor would face in locating there would be to find a suitable place to live.

"We have approximately twenty-five towns under 1,000 population which could support a physician. Several, namely Moreland, Van Buren and Cayuga, have local committees endeavoring to induce a doctor to locate in their communities. Physicians could make a pretty good living in any of the aforementioned towns.

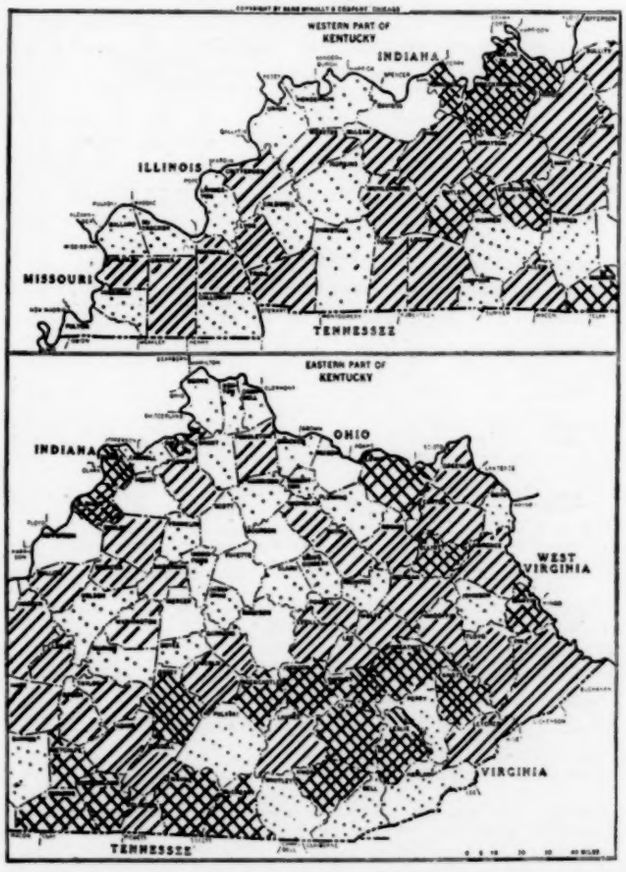
"I would say that our larger cities, including county seats, all have adequate medical service at the present time."

MR. RAY E. SMITH, Executive Secretary,
Indiana State Medical Association
1021 Hume Mansur Building
Indianapolis 4.

KENTUCKY—1946



KENTUCKY—1947



Population, based on 1943 estimated Census figures, per active physician (excludes teaching, research, hospital administration, public health and state hospitals) by county.

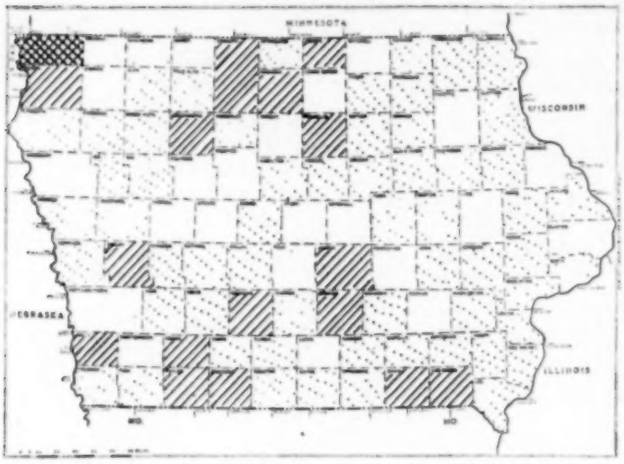
Key: Physician-population ratio by county: plain area 1-999, dotted area 1,000-1,499, striped area 1,500-2,999, checked area 3,000 and over, solid black area no doctor.

Areas in Kentucky Requesting General Practitioners

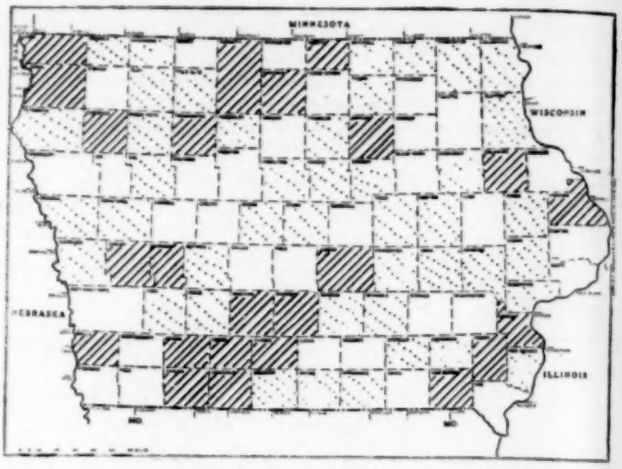
County	Town	Population
Adair	Pellyton	95
Bell	Middlesboro	11,777
Butler	Rochester	387
Caldwell		14,499
Carter		25,545
Edmonson		11,344
Elliott		8,713
Floyd	Martin	957
Garrard		11,910
Graves	Fancy Farm	417
	Folsomdale	100
	Sedalia	191
	Symsonia	200
	Water Valley	373
	Wingo	475
Greenup		24,917
	Fullerton	932
Hancock	Hawesville	806
Jackson		16,339
	McKee	190
Knott		20,007
Knox		31,029
Lawrence		17,275
	Webbville	200
Lewis		15,686
Lincoln	Hustonville	443
Livingston	Grand Rivers	499
Lyon		9,067
Marshall		16,602
Martin		10,970
McCreary	Stearns	1,548
Meade		8,827
Metcalfe		10,853
Nelson	Chaplin	187
Owen		10,942
	Gratz	139
Owsley		8,957
Powell	Clay City	627
Rockcastle		17,165
Webster		19,198
	Dixon	642
Wolfe		9,997

DR. P. E. BLACKERBY, Secretary,
Kentucky State Medical Association,
620 South Third Street, Louisville, Ky.

IOWA—1946



IOWA—1947



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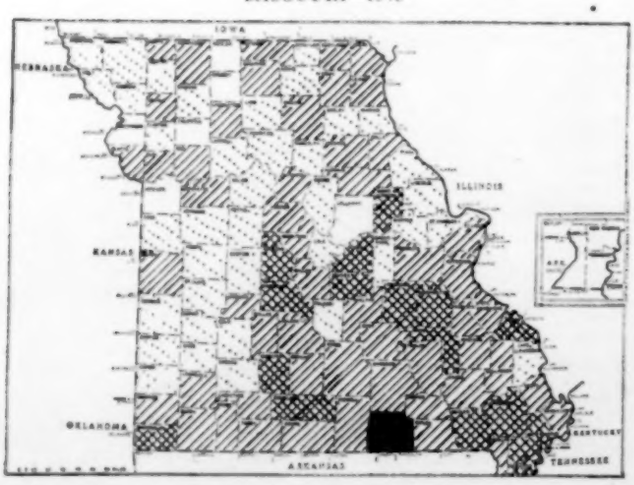
Key: Physician-population ratio by county: plain area 1-999, dotted area 1,000-1,499, striped area 1,500-2,999, checked area 3,000 and over, solid black area no doctor.

Areas in Iowa Requesting General Practitioners

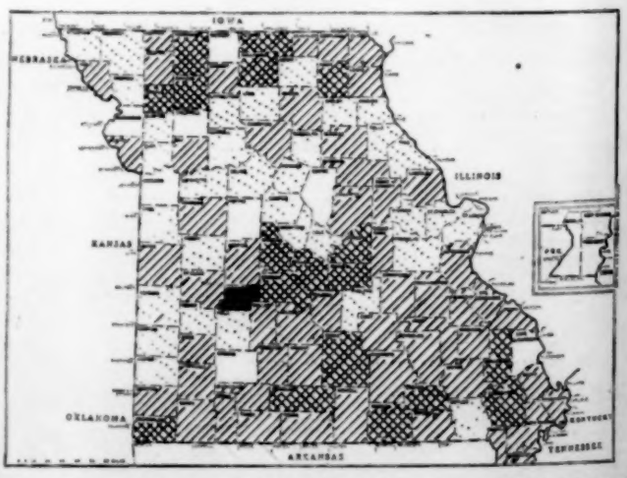
County	Town	Population
Bremer	Readlyn	426
	Tripoli	1,001
Calhoun	Lohrville	776
Clayton		24,334
Clinton	Charlotte	393
Decatur	Leon	2,307
Dickinson		12,185
Emmet	Ringsted	508
Franklin		16,379
Grundy		13,518
Guthrie	Bagley	427
	Menlo	441
	Yale	287
Hardin		22,530
Jackson		19,181
	Miles	314
Jasper	Baxter	623
	Kellogg	648
	Sully	402
Jefferson		15,762
Kossuth	Fenton	385
	Swea City	735
	Wesley	468
Linn	Fairfax	262
Madison		11,525
Marshall	Clemons	207
	Gilman	483
	Green Mountain	155
	Haverhill	100
	LeGrand	529
	Liscomb	340
	Rhodes	279
Palo Alto		16,179
	Graettinger	923
Pottawattamie	Carson	613
Poweshiek	Grinnell	5,210
	Montezuma	1,477
Ringgold		11,137
	Kellerton	563
Shelby		16,720
Sioux	Hospers	592
Tama		22,428
Taylor	Bedford	2,151
Warren		17,695
Winnebago		13,972
Winneshiek		22,262

Dr. John C. Parsons, Secretary,
Iowa State Medical Society,
505 Bankers Trust Building,
Des Moines 9.

MISSOURI—1946



MISSOURI—1947



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Key: Physician-population ratio by county: plain area 1-999, dotted area 1,000-1,499, striped area 1,500-2,999, checked area 3,000 and over, solid black area no doctor.

Areas in Missouri Requesting General Practioners

County	Town	Population
Atchison		12,897
	Fairfax	813
	Westboro	368
Benton	Cole Camp	753
Callaway		23,094
Camden	Camdenton	893
Carter	Van Buren	500
Charlton		18,084
Clark	Kahoka	1,781
DeKalb	Maysville	1,026
Johnson	Holden	1,818
Lafayette	Corder	630
Lawrence	Marionville	1,127
	Pierce City	1,208
Lincoln	Winfield	484
Monroe		13,195
	Monroe City	1,978
Oregon	Alton	600
	Koshkonong	300
Reynolds	Ellington	849
St. Clair	Osceola	1,200
St. Genevieve	St. Marys	606
Scotland		8,557
Shelby	Shelbina	2,107
Stoddard	Puxico	800
Sullivan	Milan	2,016
Taney	Forsyth	290
Vernon	Moundville	247
Webster	Marshfield	1,764
	Seymour	751

"During the year 1946 approximately 150 physicians located in rural Missouri for the first time. However, there are still a number of counties in this state which are in need of more physicians. Also during the year 1946 a number of rural communities opened hospitals which were directly responsible for the location of a number of young physicians in those areas. This experience is convincing evidence that where hospital facilities are available the problem of securing physicians is greatly reduced. One or two communities in Missouri have taken the initiative in developing hospital facilities in their communities. They have assisted these physicians in finding suitable living quarters, office space and equipment, and automobile when needed, and through this procedure have obtained the services of needed physicians. During the year 1946 a number of rural communities after careful study voted bonds to provide community hospital facilities. The Missouri State Medical Association has been successful in cooperating with a number of communities in aiding these communities to secure physicians. The state association through its Committee on Rural Medical Service has surveyed the state from the standpoint of medical manpower and has thereby been made cognizant of where physicians are badly needed and has determined for the most part whether communities can or cannot support another physician."

MR. RAYMOND MCINTYRE, Field Secretary,
Missouri State Medical Association,
623 Missouri Building,
St. Louis 3.

Coming Medical Meetings

American Medical Association, Atlantic City, June 9-13. Dr. George F. Lull, 535 N. Dearborn St., Chicago 10, Secretary.

Aero Medical Association of the United States, Atlantic City, Ritz-Carlton Hotel, June 4-6. Dr. David S. Brachman, 1016 Dime Bldg., Detroit 26, Secretary.

American Association for the Surgery of Trauma, Atlantic City, Hotel Claridge, June 5-7. Dr. Gordon M. Morrison, 520 Commonwealth Ave., Boston 15, Secretary.

American Association for Thoracic Surgery, St. Louis, May 28-30. Dr. Richard H. Meade Jr., 55 E. Washington St., Chicago 2, Secretary.

American Association of Genito-Urinary Surgeons, Absecon, N. J., June 4-6. Dr. Charles C. Higgins, 2020 E. 93d St., Cleveland 6, Secretary

American Association of the History of Medicine, Cleveland, May 25-26. Dr. Howard Dittrick, 2020 E. 93d St., Cleveland 6, Secretary.

American Association on Mental Deficiency, St. Paul, Minn., May 28-31. Dr. Neil A. Dayton, Box 51, Mansfield Depot, Conn., Secretary.

American College of Allergists, Atlantic City, Hotel Senator, June 6-8. Dr. Fred W. Wittich, 401 LaSalle Medical Bldg., Minneapolis 2, Secretary.

American College of Chest Physicians, Atlantic City, Ambassador Hotel, June 5-8. Mr. Murray Kornfeld, 500 N. Dearborn St., Chicago 10, Executive Secretary.

American College of Radiology, Atlantic City, Haddon Hall, June 7-8. Mr. Mac F. Cahal, 20 N. Wacker Drive, Chicago 6, Executive Secretary.

American Dermatological Association, Murray Bay, Quebec, Can., June 1-5. Dr. Harry R. Foerster, 208 E. Wisconsin Ave., Milwaukee, Wis., Secretary.

American Diabetes Association, Atlantic City, Chalfonte-Haddon Hall, June 7-8. Dr. Cecil Striker, 1019 Provident Bank Bldg., Cincinnati 2, Secretary.

American Geriatrics Society, Atlantic, City, Hotel Brighton, June 5-7. Dr. Malford W. Thewlis, 25 Mechanic St., Wakefield, R. I., Secretary.

American Heart Association, Atlantic City, Hotel President, June 6-7. Dr. Howard B. Sprague, 50 W. 50th St., New York, Secretary.

American Medical Women's Association, Atlantic City, June 7-8. Dr. Helen F. Schrack, 216 N. Fifth St., Camden, N. J., Secretary.

American Neisserian Medical Society, Atlantic City, Marlborough-Blenheim Hotel, June 8. Dr. William L. Fleming, 750 Harrison Ave., Boston, Secretary.

American Neurological Association, Atlantic City, Marlborough-Blenheim Hotel, June 16-18. Dr. Walter O. Klingman, 195 Ft. Washington Ave., New York 32, Secretary.

American Ophthalmological Society, Hot Springs, Va., June 5-7. Dr. Walter S. Atkinson, 129 Clinton St., Watertown, N. Y., Secretary.

American Physiological Society, Chicago, May 18-22. Dr. Maurice Visscher, University of Minnesota, Minneapolis, Secretary.

American Proctologic Society, Atlantic City, June 7-8. Dr. Harry E. Bacon, 2031 Locust St., Philadelphia 3, Secretary.

American Psychiatric Association, New York, Hotel Pennsylvania, May 19-23. Dr. Leo H. Bartemeier, General Motors Bldg., Detroit, Secretary.

American Radium Society, Atlantic City, June 8. Dr. Hugh F. Hare, 605 Commonwealth Ave., Boston 15, Secretary.

American Rheumatism Association, Atlantic City, Ritz-Carlton Hotel, June 7. Dr. Richard H. Freyberg, 321 E. 42d St., New York 17, Secretary.

American Society for Experimental Pathology, Chicago, May 19-23. Dr. Frieda S. Robschlit-Robbins, 260 Crittenden Bldv., Rochester, N. Y., Secretary.

American Society for Pharmacology and Experimental Therapeutics, Chicago, May 18-22. Dr. Harvey B. Haag, Medical College of Virginia, Richmond 19, Va., Secretary.

American Society for the Study of Sterility, Atlantic City, Hotel Strand, June 7-8. Dr. John O. Haman, 490 Post St., San Francisco 2, Secretary.

American Society of Biological Chemists, Chicago, May 18-22. Dr. Otto A. Bessey, Public Health Research Institute, New York 9, Secretary.

American Society of Clinical Pathologists, Atlantic City, June 4-8. Dr. Alfred S. Giordano, 531 N. Main St., South Bend, Ind., Secretary.

American Society of Electroencephalography, Atlantic City, Marlborough-Blenheim Hotel, June 13-14. Dr. Robert S. Schwab, Massachusetts General Hospital, Boston 14, Secretary.

American Therapeutic Society, Atlantic City, Chalfonte Hotel, June 6-7. Dr. Oscar B. Hunter, 1835 I St., N. W., Washington 6, D. C., Secretary.

American Urological Association, Buffalo, N. Y., Hotel Statler, June 30-July 3. Dr. Thomas D. Moore, 899 Madison Ave., Memphis 3, Tenn., Secretary.

Association for the Study of Internal Secretions, Atlantic City, June 6-7. Dr. Henry H. Turner, 1200 N. Walker St., Oklahoma City 3, Secretary.

Federation of American Societies for Experimental Biology, Chicago, May 18-22. Dr. William H. Chambers, 1300 York Ave., New York 21, Secretary.

Idaho State Medical Association, Sun Valley, June 16-19. Dr. William B. Handford, Caldwell, Secretary.

Maine Medical Association, York Harbor, Marshall House, June 22-24. Dr. Frederick R. Carter, 142 High St., Portland 3, Secretary.

Massachusetts Medical Society, Boston, Hotel Statler, May 20-22. Mr. Robert St. B. Boyd, 8 Fenway, Boston 15, Executive Secretary.

Medical Library Association, Cleveland, Wade Park Manor, May 27-29. Miss Heath Babcock, New York State Medical Library, Albany 1, New York, Secretary.

Minnesota State Medical Association, Duluth, June 30-July 2. Dr. B. B. Souster, Lowry Medical Arts Bldg., St. Paul 2, Secretary.

Montana, Medical Association of, Missoula, June 26-28. Dr. H. T. Caraway, 115 N. 28th St., Billings, Secretary.

National Gastroenterological Association, Atlantic City, Hotel Chelsea, June 4-6. Dr. G. Randolph Manning, Room 319, 1819 Broadway, New York, Secretary.

National Tuberculosis Association, San Francisco, June 16-19. Dr. F. D. Hopkins, 1790 Broadway, New York 19, Executive Secretary.

New Hampshire Medical Society, Portsmouth, Hotel Wentworth, June 19-20. Dr. Carleton R. Metcalf, 5 South State Street, Concord, Secretary.

New York State Association of Public Health Laboratories, Syracuse, May 27. Miss Mary B. Kirkbride, New Scotland Ave., Albany 1, Secretary.

North Dakota State Medical Association, Fargo, May 25-27. Dr. L. W. Larson, 221 Fifth St., Bismarck, Secretary.

Society of Surgeons of New Jersey, Atlantic City, Seaview Country Club, May 28. Dr. Walter B. Mount, 21 Plymouth St., Montclair, N. J., Secretary.

South Dakota State Medical Association, Rapid City, May 31-June 3. Dr. Roland G. Mayer, 22½ S. Main St., Aberdeen, Secretary.

Wyoming State Medical Society, Sheridan, June 23-25. Dr. George E. Baker, 226 E. 2d St., Casper, Secretary.

Official Notes

TRAINS FROM PHILADELPHIA TO ATLANTIC CITY

For the information of persons attending the Centennial Session of the American Medical Association in Atlantic City, June 9-13, the Pennsylvania Railroad will run trains daily leaving Philadelphia for Atlantic City in the forenoon at 7:15, 8:30 and 9:30 Eastern Standard Time. The last train returning to Philadelphia from Atlantic City leaves at 9:30 p. m. Extra cars will be added to these trains during the period of the meeting if the need arises.

Medical Legislation

STATE LEGISLATION

California

Bills Passed.—A. 438, which passed the house April 28, proposes that **no blind person** shall be denied admission into any college or school of chiropractic or denied admission to examination and licensure because of such blindness. S. 1068, which passed the house May 2, proposes to prohibit any person other than a physician and surgeon from making a **postmortem examination** or performing an autopsy. S. 1265, which passed the senate April 28, proposes to exempt from the provisions of the **osteopathic practice act** persons holding drugless practitioner's certificates issued by the board of osteopathic examiners.

Bills Enacted.—A. 796, which has become chapter 125 of the Laws of 1947, amends the health and safety code by authorizing a person, by will, to direct that the whole or **any part of his remains** be given to a teaching institution, university, college or legally licensed hospital, or to the state director of public health. A. 797, which has become chapter 126 of the Laws of 1947, authorizes every person of sound mind over the age of 18 years to dispose, by will, of the whole or **any part of his or her body** to a teaching institution, university, college or legally licensed hospital, either for use as such institution, university, college or hospital may see fit or for use as expressly designated in the will.

Connecticut

Bill Passed.—H. 922, which passed the senate April 29, proposes to suspend the operation of the provisions of **the naturopathic practice act** relating to licensure without examination until the adjournment of the 1947 session of the general assembly.

Florida

Bills Enacted.—H. 363 proposes to authorize a court to admit in evidence testimony relative to **the amount of alcohol** in a defendant's blood as shown by a chemical analysis of his breath, urine or other bodily substance whenever a defendant is indicted or tried for being under the influence of intoxicating liquor when he committed reckless homicide or when he drove a vehicle. H. 402 and S. 291 propose to authorize the several cities and towns of the state to levy **license taxes** for the purpose of regulation and revenue on professions. H. 440 and S. 394 propose to make it unlawful for **tax collectors** in the several counties to issue state and county occupational licenses to any person applying for license to practice medicine in any of its branches unless and until proof of current qualification and competency, as established by certificate or license issued by the state boards duly constituted and legally authorized to determine qualification and competency, be exhibited at the time of making such application. H. 506 proposes the creation of the **University of Florida School of Medicine,** to be located some place in Hillsborough County. H. 507, to amend the law relating to massage, proposes to authorize licentiates thereof to use **electrical apparatus for** the purpose of body massaging, reducing or contouring but prohibits them from engaging in fever therapy. S. 359 proposes that drugs containing **barbituric acid,** declared by the bill to be dangerous, shall not be sold at retail except on written prescription signed by a member of the medical, dental, osteopathic or veterinary profession. Such prescriptions could not be refilled.

Bill Passed.—H. 253, which passed the house April 30, proposes to authorize persons to **donate and give their eyes** for eyesight restoration purposes by last will and testament and authorizes any state, county, district or other public hospital to purchase and provide the necessary facilities and equipment to establish and maintain an eye bank for restoration of sight purposes.

Maryland

Bills Enacted.—H. 256, which has become chapter 716 of the Laws of 1947, appoints the state board of health as an agency to administer a program of noninstitutional services for **mentally ill persons** and to develop a program for extending and improving services to such persons. H. 394, which has become chapter 739 of the Laws of 1947, repeals the existing law regulating the sale of **barbituric acid** and enacts a new law designed for the same purpose. H. 663, which has become chapter 810 of the Laws of 1947, designates the state board of health as the sole agency to represent the state of Maryland in obtaining benefits under the federal hospital survey and construction act and authorizes the governor to appoint an **advisory council on hospital construction.** H. 709, which has become chapter 824 of the Laws of 1947, authorizes the appointment of a **medical advisory board** to which would be referred all cases of persons applying for a driver's license when the granting of a license to such person would be inimical to public safety and welfare because of an existing or suspected mental or physical disability.

Michigan

Bills Introduced.—H. 451 proposes the enactment of a law requiring the licensing, regulation and inspection of hospitals and related institutions and the appointment of an **advisory institutional council.** H. 495 proposes to amend the penal code by making it a misdemeanor for any person to subject a cat, dog or bird or cause it to be subjected to **experimentation or mutilation** while alive or cause it to be sold for the purpose of being subjected to experimentation or mutilation.

New Hampshire

Bill Introduced.—H. 371 was previously reported as proposing the enactment of a **hospital licensing law.** This proposal was amended by house committee on April 29 in part as follows: "No such rules, regulations or standards shall be adopted or enforced which would have the effect of denying a license to a hospital or other institution required to be licensed hereunder, solely by reason of the school or system of practice employed or permitted to be employed by physicians therein; provided that such school or system of practice is recognized by the laws of this state."

New Jersey

Bill Introduced.—A. 314 proposes a licensing law for **nursing homes and hospitals.** An April 14 amendment provided, among other things, that a licensing authority or agency should have no authority "to require any hospital to practice or permit sterilization of human beings, euthanasia, birth control or any other similar practice contrary to the dogmatic or moral beliefs of any well established religious body or denomination."

Bills Enacted.—S. 66, which has become chapter 83 of the Laws of 1947, appoints the state department of institutions and agencies as the agency to receive federal funds to assist in a **state survey of hospitals** and the development of a state program for the construction of additional needed hospital facilities. S. 335, which has become chapter 88 of the Laws of 1947, provides an appropriation to the state department of health for the **purchase of smallpox vaccine** and the distribution thereof free on such terms as the state department of health shall determine.

Oregon

Bill Enacted.—S. 77, which has become chapter 488 of the Laws of 1947, repeals the existing laws requiring the licensing of **maternity hospitals** and certain other types of institutions and sanatoriums and provides a licensing, inspecting and regulating law for all hospitals and related institutions within the state.

Pennsylvania

Bills Introduced.—H. 982 was previously reported as redefining the **practice of chiropody.** A house amendment of April 30 further redefines chiropody as "the diagnosis and treatment of the ailments of the human foot. This shall not confer the right to amputate any part of foot leg or toes or the use of any anesthetic other than local or the treatment of any constitutional disease." H. 1317 proposes the creation of a state **board of chiropractic examiners** and defines chiropractic as "a philosophy science and art of things natural a system of locating misaligned or displaced vertebrae of the human spine the procedure preparatory to and the adjustment by hand of such misaligned and misplaced vertebrae and other articulations and tissues of the human body together with the use of x-ray and other scientific instruments of analysis."

Bills Passed.—H. 905, which passed the senate April 28, to amend the law relating to the **practice of osteopathy,** proposes to extend until June 30, 1948 the requirement of a nine months internship prior to examination. H. 917, which passed the senate April 29, to amend the medical practice act, proposes to repeal the 1943 law which reduced for a limited period of time the training period of **medical internship in hospitals.** H. 921, which passed the senate April 29, to amend the medical practice act, proposes to repeal the 1943 law authorizing the issuance of **temporary permits to practice** medicine under certain conditions.

South Carolina

Bill Introduced.—S. 722 proposes to authorize the admissibility in evidence of **microphotographs** or films of any record to the same extent as the originals thereof would have been admitted.

Bill Passed.—H. 24, which passed the house May 1, to amend the marriage law, proposes to require each applicant for **a marriage license** to present a certificate signed by a duly licensed physician of his state certifying that such person is of sound mind and free from venereal disease. H. 761, which passed the senate April 30, appoints a commission to make a full investigation of the practices of the **board of naturopathic examiners** in the state in the matter of issuance of licenses, the examinations and personal qualifications required of applicants to practice naturopathy in the state and the propriety of granting licenses therefor.

Vermont

Bill Enacted.—H. 317, which was approved April 26, provides **a licensing law** for hospitals, sanatoriums, rest homes, nursing homes, homes for the reception of children and related institutions.

GOVERNMENT SERVICES

ARMY

ADDITIONAL TIME FOR MEDICAL PERSONNEL TO SEEK COMMISSIONS

The War Department announces that applications from certain types of medical personnel for Regular Army commissions would be received for an additional three months period beginning May 1 and ending July 31. The original deadline for applications under the Regular Army Integration Program of 1947 had passed on January 31.

Twelve classifications of medical officers and former medical officers will be affected by the new ruling. The classifications are those of bacteriologist, biochemist, parasitologist, serologist, clinical laboratory officer, entomologist, nutrition officer, toxicologist, industrial hygienist, sanitary engineer, clinical psychologist and psychiatric social worker.

The additional application period was announced in an effort to obtain more medical candidates for Regular Army commissions. The first increment of officers brought into the Army in 1947 contained far below the desired proportion of medical officers.

Applicants are limited to medical officers now on active duty and former medical officers of World War II who are or have been qualified in one of the aforenamed specialties. Persons interested were invited to forward applications to the Adjutant General, Attention AGSO-R, Washington 25, D. C., or (in the case of officers now on active duty) through military channels to the Adjutant General.

SALE OF SURPLUS GOVERNMENT PROPERTY

The War Assets Administration is conducting sales of surplus government property announced by the following regional offices. Physicians who are veterans have certain priorities in the purchase of this government property.

Regional Office, 1409 Second Avenue, Seattle. Sale of operating tables, instrument cabinets, specialists chairs (metal), instrument sterilizers, operating lamps. Sale closes May 26.

Regional Office, 37 Broadway, New York 6. Sale of drugs and pharmaceuticals. Sale closes May 19.

Regional Office, 412 West Market Street, Louisville 2, Ky. Sale of surgical sutures (catgut, braided silk and nylon). Sale closes May 22.

Regional Office, 404 South Wabash Avenue, Chicago 5. Sale of hospital and laboratory equipment and supplies, including rubber tubing (synthetic), instrument trays, instrument tables, hospital beds, perimeters, phorometers, anesthesia apparatus, invalid chairs, litters, chart holders, utensil sterilizers, bedside tables. Sale closes May 26.

Regional Office, 95th and Troost, Kansas City, Mo. Sale of hospital beds, cassettes, oxygen therapy apparatus, bandages, litters, stereoscope (x-ray, large), syringes, surgical instruments, forceps, curets, abdominal retractors, rubber gloves, hot water bags. Sale closes June 4.

Regional Office, 33 Berry Street, San Francisco 7. Sale of drugs and pharmaceuticals. Sale closes May 26.

NAVY

STUDENTS MAY APPLY FOR NAVY COMMISSIONS

The Bureau of Medicine and Surgery, Navy Department, Washington, D. C., announces that students and graduates of accredited medical schools may apply for appointment to commissioned rank in the Navy or the Navy Reserve in the following grades:

1. Assistant Surgeon, U. S. Naval Reserve: All fourth year male students of good scholastic standing enrolled in approved medical schools and male graduates of such schools engaged in intern training or civilian practice (after internship) who meet the prescribed requirements are eligible to apply for appointment to the grade of Assistant Surgeon with the rank of Lieutenant (jg) in the Medical Corps of the U. S. Naval Reserve. Appointment to this status carries no obligation for active naval service except on a purely voluntary basis notwithstanding the extent of any past V-12 training or affiliation. Those former V-12 students who graduated from medical school prior to July 1, 1946 are excluded from this provision and will be required to perform active duty on acceptance of their appointments. Doctors whose age, professional experience and academic seniority justify a more senior grade may make application for appointment to grades above that of Assistant Surgeon.

2. Acting Assistant Surgeon, U. S. Navy (Intern): All fourth year male students of good scholastic standing enrolled in approved medical schools in the United States and Canada who meet prescribed requirements are eligible to apply for appointment to the grade of Acting Assistant Surgeon with the rank of Lieutenant (junior grade) for intern training in a naval hospital. Selected candidates will be issued an appointment and orders to active duty for internship on receipt in the department of a certificate from the dean or registrar of their school to the effect that they have completed their medical school education. Acting Assistant Surgeons are under no obligation to continue in the naval service beyond completion of prescribed course of intern training. The grade of Acting Assistant Surgeon does not exist in the Naval Reserve, nor is intern training in the Navy extended to members of the Medical Corps of the Naval Reserve.

3. Assistant Surgeon, U. S. Navy: Graduates of approved medical schools who have completed intern training in an accredited hospital or who will complete such training within four months of a date set for examination and who meet prescribed requirements are eligible to apply for examination for appointment as Assistant Surgeon with the rank of Lieutenant (junior grade) in the Medical Corps of the Navy. Candidates for this grade are required to appear before boards of medical examiners and supervisory examining boards at a naval hospital on a prescribed date to establish their physical and professional qualifications for appointment. The acceptability of candidates will be finally determined by boards convened in the Navy Department from a review of reports of examination conducted in the field (the next examinations for Assistant Surgeon, U. S. Navy, are scheduled for June 23 to 27, 1947 and thereafter for Oct. 6 to 10, 1947). The grade of Assistant Surgeon represents the lowest permanent grade in the Medical Corps of the Navy and might be classed as the starting point of continuous active service for the physician who elects a career in naval medicine.

4. Ensign, HP (Med), U. S. Naval Reserve: Male students enrolled in or accepted for enrolment in the next convening class of an approved medical school who meet prescribed requirements are eligible for appointment to the probationary rank of Ensign, HP, in the Naval Reserve. Under the current program this appointment carries with it no obligations for active naval service notwithstanding previous V-12 training, nor is the appointee required to accept superseding appointment in the Medical Corps of the Navy or the Naval Reserve on graduation from medical school. This commission is subject to revocation by reason of scholastic failure or for other reason at the discretion of the Secretary of the Navy and in any event becomes subject to revocation on completion of medical school education whether or not the appointee accepts superseding appointment in the Medical Corps of the Navy or the Naval Reserve.

VETERANS ADMINISTRATION

MORE ACCURATE DISABILITY RATINGS

Of the 2,692,000 compensation and pension cases subject to review under the new disability rating schedule approved by the last Congress, the Veterans Administration reviewed 842,000 cases between Aug. 1, 1946 and March 1, 1947. This is 31 per cent of the total. All claims are reviewed automatically and may increas in compensation resulting from the review will be retroactive to April 1, 1946 under the law. The Veterans Administration therefore requests disabled veterans not to make inquiries about their cases while they are pending.

The new schedule, known as the Schedule for Rating Disabilities—1945 Edition, permits the Veterans Administration to make a more accurate evaluation of veterans' disabilities than preceding schedules did; it also provides for new types of combat wounds and tropical diseases encountered by members of the armed forces during World War II.

While the new schedule provides increased ratings for certain types of disabilities and decreases for other types, it does not make any blanket change in ratings. However, the increases far outnumber the decreases. Disability compensation for veterans of both world wars range from $13.80 a month for 10 per cent disability to $138 a month for total disability. Some awards are fixed by law for certain types of disabilities, such as blindness in both eyes, loss of two or more limbs or paraplegia (spinal cord injury). These awards may run as high as $360 a month.

VETERANS' HOSPITAL AT ALBANY, N. Y.

The site of the 1,000 bed veterans' hospital to be constructed at Albany, N. Y., comprises about 25 acres bordered on the southeast by Hackett Boulevard. The structure will be fireproof and ten stories high except for the small center portion,

Proposed Veterans' Hospital at Albany, N. Y.

which will be fourteen stories. In addition to the main building there will be quarters for nurses and homes for hospital staff members. Construction of the hospital will be under the direction of the New York District Corps of Engineers, U. S. Army, and construction work is expected to begin this month.

BLINDED VETERANS

Fifteen of the 1,133 veterans who lost their sight in World War II are training to be social workers and eleven others are employed as counselors to the blind; three of the eleven have positions as placement agents, two as industrial counselors, two as supervisors of business enterprises, one as an executive director of the Veterans Administration, one as supervisor of adult visitation, one as an orientation officer and one as an employment interviewer.

The survey made by the Veterans Administration revealed that nearly half of the blind veterans discharged by the Army and Navy up to the end of 1946 were either working or in training; 28 per cent were employed, and of these 197 had full time jobs, 52 part time jobs and 72 were self employed. Another 20 per cent, or 231, were in vocational rehabilitation training, of whom 51 were taking on-the-job training and 180 were in schools and colleges.

Blinded veterans eligible for education and training under Public Law 16, receive in addition to tuition and fees a subsistence allowance from the Veterans Administration of $90 a month if they have dependents or $65 without dependents. Their disability compensation payments are not affected by these subsistence payments. If compensation and subsistence do not total at least $105 a month for a veteran with no dependents or $115 with one dependent, an additional sum is paid to make up the difference. The sum is further increased if there is more than one dependent.

HOSPITAL NEWSPAPERS

More than one hundred newspapers are published for patients in Veterans Administration hospitals and homes as a part of the program to aid in the medical rehabilitation of veterans. The papers are edited and staffed by patients and hospital employees, with the cooperation of officers who assign patients with certain disabilities to the newspaper staff as part of their treatment and vocational training. Patients with aptitudes for writing are encouraged to contribute to the papers for recreation. Most of these hospital newspapers are mimeographed; however, nine are printed on presses in the hospital's occupational therapy departments and four are multilithed.

Contests are being sponsored by the Advertising Club of Boston and the New York Advertising Club for the "best Veterans" Administration hospital newspaper in those sections of the country. When the contests close at the end of May plaques will be awarded to the winning paper in each area.

PLASTIC SURGERY CENTERS

The Veterans Administration has twenty-two plastic surgery centers for veterans in operation in Veterans Administration, army and navy hospitals over the country. These centers are manned by specialists skilled in plastic surgery and are provided with special equipment. They are in hospitals at West Roxbury, Mass.; Bronx, N. Y.; Washington, D. C.; Cleveland; Jefferson Barracks, Mo.; Fort Logan, Colorado; San Francisco; New Orleans; White River Junction, Vt.; Aspinwall, Pa.; Chamblee, Ga.; Hines, Ill.; McKinney, Texas; Los Angeles, and Van Nuys, Calif.

OPEN SUBREGIONAL OFFICE IN GARY, IND

Dr. Seymour R. Salberg has been appointed chief medical officer of the subregional office of the Veterans Administration in Gary, Ind. A graduate of the University of Illinois Medical School, Dr. Salberg formerly served also at a veterans' hospital in New York. The medical unit in this office when fully staffed will comprise twenty-seven persons, six of whom will be physicians, three dentists and several others technicians. There will also be x-ray and bacteriologic laboratories, hydrotherapy, physical therapy, a mental hygiene clinic and other services. The opening of this office will make it unnecessary for veterans in this vicinity to travel to the veterans' hospital at Hines, Ill., for examination and treatment.

VETERANS' HOSPITAL IN NEW YORK CITY

The 1,000 bed veterans' hospital to be constructed in New York City for general medical patients will be seventeen stories high with a penthouse and will cover a plot between 24th and 25th streets adjacent to the New York Medical School and Bellevue Hospital. The hospital will be of fireproof construction. The main structure will have, besides the hospital proper, a solarium on each floor and facilities for occupational therapy treatment, nurses' and staff quarters, chapel and auditorium. It will be constructed by the U. S. Army Corps of Engineers, the district office being in charge of Col. W. F. Heavey.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

CALIFORNIA

Course in Applications of Nuclear Physics.—A course in the applications of nuclear physics to the biologic and medical sciences will be given at the University of California Medical Center, San Francisco, June 30-July 18. The general subjects for the three weeks will be (1) an introduction to nuclear physics, (2) radioactive tracers in biology and medicine, (3) radioactive tracers, therapeutic and diagnostic applications of radio elements and health-physics. The instructors will be members of the various faculties of the University of California under the general direction of Dr. Stacy R. Mettier, associate professor of medicine, and under the general chairmanship of Dr. William J. Kerr, professor of medicine. The morning lecture periods will cover various phases of the subjects mentioned; in addition, special lectures and evening seminars will be given. The afternoons will be given over largely to laboratory work. Requests for registration should be addressed to Dr. Mettier, University of California Medical Center, San Francisco 22.

COLORADO

Studies of the Hypothalamic Region.—Two professors at the University of Colorado School of Medicine, Denver, received a grant totaling $24,000 from the Office of Navy Research. The grant was awarded to Robert M. Hill, Ph.D., professor of biochemistry, and Dr. Archibald R. Buchanan, professor of anatomy, for studies on the hypothalamic region of the brain in relation to the regulation of body temperature. Assisting Dr. Hill and Dr. Buchanan in their research are Dr. Enid K. Rutledge, associate professor of pathology, and Benjamin Robinson, James Roberts and Mrs. Alvey McChesney of the anatomy department.

Medical Research Club.—To stimulate correlation between basic sciences and clinical research, the faculty of the University of Colorado School of Medicine, Denver, and regional doctors have organized the Medical Research Club of Colorado. Membership is open to any one in the region interested in medical research or the allied sciences of physics, chemistry, biology and sociology. Monthly meetings will consist largely of reports on medical research in progress by club members. The club will meet in the clinical amphitheater of the University of Colorado School of Medicine, according to Dr. Abe Ravin, assistant professor of medicine and president of the club. The secretary is Dr. Dalton Jenkins, resident in medicine, University of Colorado School of Medicine, 4200 East Ninth Avenue, Denver.

Industrial Research.—To continue research in determining the effects of various heavy metals, particularly cadmium, on industrial workers, the National Institute of Health has renewed its grant for $28,512 to the division of industrial hygiene of the University of Colorado School of Medicine, Denver. The purpose of the research is to discover how much cadmium can be present in the air before it becomes harmful to workers in local smelters and also to determine how much cadmium can be present in body fluids before a toxic stage is reached and the workers must be removed from their jobs. Similar work has already been accomplished by the division of industrial hygiene in establishing safeguards for lead poisoning. The research is being carried on in the new research laboratory recently constructed in the division of industrial hygiene (THE JOURNAL, Dec. 21, 1946, p. 1019).

CONNECTICUT

State Medical Election.—At the annual meeting of the Connecticut State Medical Society April 29-30 Dr. James R. Miller, Hartford, assumed the office of president, succeeding Dr. Cole B. Gibson, Meriden, who was elected treasurer. Dr. Samuel C. Harvey, New Haven, was named president-elect, and Dr. Creighton Barker, New Haven, executive secretary. More than 1,000 physicians attended the meeting.

Appointment to Health Council.—Dr. W. Bradford Walker, Cornwall, was recently appointed by Governor James L. McConaughy as a member of the Connecticut Public Health Council for a term of six years, effective July 1. Formerly president of the Connecticut Public Health Association, Dr. Walker is a fellow of the American College of Physicians and attending senior physician at the Charlotte Hungerford Hospital, Torrington. He received his medical degree at the Yale University School of Medicine, New Haven, in 1920.

FLORIDA

Narcotic Violation.—Dr. Alfred E. O'Neil, 2554 South West Eighth Street, Miami, pleaded guilty to violation of the Federal Narcotic Law and on February 26 was sentenced to a term of eighteen months, which was suspended, and he was placed on probation for a period of three years.

Miami to Establish Medical School.—At a meeting April 16 the trustees of the University of Miami authorized the establishment of a school of medicine to be opened by October. The step was taken as the state legislature was debating bills to establish a medical and dental college as a branch of the University of Florida at Gainesville. Bowman F. Ashe, LL.D., president of the University of Miami, said that the decision of the trustees "has no connection" with the proposed state school. The city of Miami has offered 10 acres near the James M. Jackson Memorial Hospital as a site. The building is not needed to open the school, says Dr. Ashe, since first year's classes can be held in present classrooms.

ILLINOIS

Convicts Paroled Following Malarial Tests.—Seventy-six inmates of Statesville Prison, Joliet, who volunteered for wartime antimalarial experiments which yielded drugs helpful in the treatment and cure of malaria were paroled April 18. The prisoners had served an average of six years and fourteen days. A survey was conducted at the request of Governor Green by the correction division to determine what consideration should be given those who voluntarily submitted to the experiments. In a few cases in which factors unfavorable to parole predominated, the division entered "no change" orders.

Report on Disease Carriers.—A report from the Illinois Department of Public Health shows a reduction in the number of typhoid, paratyphoid and diphtheria cases and carriers in the last decade, as well as a comparison between the numbers in Chicago and downstate:

Typhoid and Paratyphoid

	State		Chicago		Downstate	
Year	Cases	Carriers	Cases	Carriers	Cases	Carriers
1946.....	116	22	15	5	101	17
1937.....	540	54	75	10	465	44
Diphtheria						
1946.....	469	660	35	489	434	171
1937.....	1,671	1,918	655	1,802	1,016	116

From the ratio of cases to carriers reported in Illinois it can be seen, the report states, that Chicago has done a better job of discovering the year of carriers of virulent diphtheria organisms than the downstate communities.

Semicentennials.—Twelve eastern Illinois physicians who have had fifty or more years of practice received gold service buttons at the 8th District conference of the Illinois Medical Society in Mattoon April 17. They are Drs. Nicholas C. Iknayan, Charleston; Elijah G. Davis, Wakefield; Cyrus M. Harris, Casey; Dellie L. Wilhoit, Martinsville; Milton M. Brayshaw, Toledo; June J. Hinkley, Westfield; Alexis T. Telford and William E. Fritschle, Olney; John W. Kirk, Oblong; George E. Loesch, Palestine; Raymond C. Gillogly, Newman, and Edward H. Robinson, Lawrenceville. The speakers were Dr. George A. Hellmuth, Chicago, "Prognosis of Heart Disease"; Dr. James H. Hutton, Chicago, "Common Endocrine Disturbances"; Dr. Charles E. Galloway, Evanston, "Early Diagnosis of Carcinoma of the Cervix"; Dr. Harry A. Oberhelman, Chicago, "Relationship of Chronic Cystic Mastitis to Cancer of the Breast"; Dr. G. Henry Mundt, Chicago, "Diagnosis and Management of Sinus Disease."

Chicago

Society of Internal Medicine.—The annual dinner of the Chicago Society of Internal Medicine will be held May 26 at the Drake Hotel at 7:30 for members only. Besides the annual business meeting Fay-Cooper Cole, Ph.D., professor and chairman of the department of anthropology, University of Chicago, will address the group on "Medicine Man."

The Mayo Lecture.—The Charles H. Mayo Lecture will be delivered May 21 at 4 p. m. in the Archibald Church Library of the Northwestern University Medical School by Dr. Herbert J. Seddons, Nuffield professor of orthopedic surgery, University of Oxford, and surgeon in chief, Winfield-Morris Orthopedic Hospital, London, on "Surgical Experiences in Peripheral Nerve Injuries."

Smoke Abatement Program.—During March Chicago's air was 27.5 per cent cleaner than in February, according to records obtained from twenty-two stations throughout the city. Newspaper publicity and an increase in rainfall in March over February is believed to account for the average of 57.99 tons of dust and smoke per square mile in March as compared to the citywide average of 80.38 tons in February.

Medical Editor Appointed.—Dr. Lee D. van Antwerp, Meriden, Conn., has been appointed to the newly created post of medical editor to G. D. Searle and Company, Chicago. Dr. van Antwerp, a graduate of the University of Michigan Medical School, Ann Arbor, in 1931, has served as editor of the *Centaur*, official publication of Alpha Kappa Kappa Medical Fraternity, since 1936. He served in the Army Medical Corps in the recent war and for many years has been connected with the Undercliff State Tuberculosis Sanatorium in Meriden, Conn., and as consultant in chest and medical diseases at the Meriden Hospital. He is a member of the American College of Physicians and of the American Medical Association.

Illinois Gets the Hertzler Manuscripts.—The University of Illinois College of Medicine has received manuscripts for four books, thirty-four unpublished addresses and miscellaneous writings by the late Dr. Arthur E. Hertzler, famed "horse and buggy doctor" of Halstead, Kan., from his widow, Dr. Irene A. Koeneke. The original manuscript of "The Horse and Buggy Doctor," first published in 1938, will be presented to the university by Dr. Koeneke in the near future. Publication of the addresses under the title "The Doctor Speaks His Mind" was halted by Dr. Hertzler's death on Sept. 12, 1946, at the age of 76. The manuscripts will be added to the 7,000 volume private medical library which Dr. Hertzler presented to the university in 1937. In addition to the gifts, Dr. Hertzler contributed $54,000 to the university three years ago to establish a foundation in visual education and medicine.

LOUISIANA

Decrease in Typhus Cases.—Since the resumption of an extensive rat control program in Louisiana during 1944 a substantial reduction in typhus cases in the state has been noted. The program consisted in rat poisoning, DDT dusting and rat proofing. During 1946 an intensified control program practically covered the state. The expenditure for 1946 was about $420,000. Typhus cases decreased from 423 in 1945 to 288 in 1946, a 32 per cent decline. The decline of cases in the state, exclusive of New Orleans, where the campaign is still not widespread, was from 306 in 1945 to 168 in 1946, a drop of 45 per cent.

MICHIGAN

Changes in Health Officers.—Dr. William C. Harrison, formerly of Minneapolis, will assume duties as director of the Delta-Menominee district health department at Powers, Mich., July 1. The two county health unit will be merged when he takes charge. Dr. Harrison, a graduate of the University of Minnesota Medical School, Minneapolis, practiced medicine in Minnesota until he entered military service and was discharged with the rank of lieutenant colonel. He is attending the school of public health, where he will receive his master's degree.—— Dr. Russell E. Pleune has resigned as director, Northern Peninsula office, state department of health, and has accepted the position of chief, tuberculosis section, McCloskey Veterans' Hospital, Temple, Texas. Dr. Pleune is a graduate of Rush Medical School, University of Chicago, and completed his studies in public health work at Harvard Medical School, Boston.

Annual Alumni Clinic Day.—Wayne University College of Medicine (Detroit) alumni held their Annual Clinic Day May 14. Guest speakers included Drs. Emery A. Rovenstine, professor of anesthesia, New York University College of Medicine, New York, "Nerve Block Therapy"; W. Wayne Babcock, professor of surgery and clinical surgery, surgeon in chief, Samaritan Hospital, Philadelphia, "Complications of Abdominal Surgery"; John H. Couch, University of Toronto, Toronto, "Conservation of Function in Hand Amputations"; Kenneth F. Lowry, Ohio State University College of Medicine, Columbus, Ohio, "Application of Delayed Suture in the Management of Wounds"; Tom D. Spies, director of Nutrition Clinic, Hillman Hospital, Birmingham, Ala., "Recent Advances in Nutrition"; Louis H. Newburgh, professor of clinical investigation, University of Michigan Medical School, Ann Arbor, "Work of the Kidney Cells." Life membership in the association and "golden anniversary" certificates were awarded the sixteen surviving members of the graduating class of 1897 at the banquet.

MINNESOTA

Society News.—At a recent meeting of the Minneapolis Surgical Society, Dr. L. Haynes Fowler was elected president, succeeding Dr. Thomas J. Kinsella; Drs. Carl O. Rice vice president, Rudolph E. Hultkrans treasurer and Ernest R. Anderson secretary.

Regional Cancer Courses.—One day regional continuation courses for medical and lay workers in cancer education began in Worthington March 25, with similar regional monthly meetings scheduled for all sections of the state for the rest of the year except July and August. They are under a joint sponsorship of the Minnesota Department of Health, Minnesota Cancer Society, the University of Minnesota and the state medical association. Talks and demonstrations by cancer specialists from the university and by local physicians will provide the information about cancer. At the annual meeting of the Minnesota Cancer Society in March the society voted to change its official name to Minnesota Division, American Cancer Society, Inc. At the same time it presented the University of Minnesota with $75,000 toward a cancer research institute and, with the state department of health, set aside $15,000 for a cancer detection center.

MISSOURI

Personal.—Dr. Evarts A. Graham, professor of surgery, Washington University School of Medicine, St. Louis, has been made an honorary member of the Belgian Society of Surgery and of the French Academy of Surgery.

Society Elections.—Dr. W. Barry Wood, professor of medicine, Washington University School of Medicine, St. Louis, was elected president of the St. Louis Society of Medicine at a recent meeting.——Dr. Wendell G. Scott, associate professor of clinical radiology, Washington University School of Medicine, St. Louis, was reelected president of the St. Louis Radiological Society for the coming year.

St. Joseph Clinical Society.—At a meeting of this society in St. Joseph, April 23-24, the subjects discussed included diagnosis and treatment of pulmonary embolism, duodenal ulcer in children and cirrhosis of the liver. Among the guest speakers were Dr. Louis A. Brinsting, associate professor of dermatology and syphilology, Mayo Clinic, Rochester, Minn., "Recent Developments in the Treatment of Syphilis"; Dr. John M. Waugh, assistant professor of surgery, Mayo Clinic, "Carcinoma of the Rectosigmoidal Area," and Dr. Harold C. Lueth, dean and professor of medicine, University of Nebraska College of Medicine, Omaha, "Management of Coronary Thrombosis in the Younger Patient."

NEW YORK

Home for the Aged.—Mr. Isidore Greenspan, executive director of the Brooklyn Hebrew Home and Hospital for the Aged, celebrated his twenty-five year association with that institution on May 1. From a home of 109 beds the institution has grown to be a home and hospital for chronic seniors, with a capacity of 711. Plans are under way for a new 400 bed structure and modernization plans of the older properties.

Annual Reifenstein Lecture.—The annual Edward C. Reifenstein Lecture in medicine was given April 22 at the Syracuse University College of Medicine auditorium, Syracuse, by Dr. George W. Thorn, Hersey professor of the theory and practice of physic, Harvard Medical School, and physician in chief, Peter Bent Brigham Hospital, Boston, on "Diagnosis and Treatment of Adrenal Cortical Insufficiency."

Cancer Control in Wayne County.—A plan for the early detection and treatment of cancer has been charted by the recently organized Wayne County Branch, New York State Division, American Cancer Society, in collaboration with the county medical society. The plan includes a complete physical examination for every person in the county, medical records of patients in the Wayne County Laboratory and a speakers' bureau established by the medical society to assist in the educational program. Every town and local organization will conduct an educational cancer program during the year.

New York City

Eighth Harvey Lecture.—Dr. Samuel Z. Levine, New York, professor of pediatrics, Cornell University Medical College, New York, delivered the eighth Harvey Lecture of the current series at the New York Academy of Medicine May 15 on "Aromatic Amino Acid Metabolism in Human Nutrition and the Role of Vitamin C."

Postgraduate Course in Rheumatic Fever. — A postgraduate course in rheumatic fever and rheumatic heart disease will be conducted at St. Francis Sanatorium for Cardiac Children, Roslyn, L. I., July 14-25. Informal lectures and discussions supplemented by examination and study of patients, roentgenography and electrocardiography and their practical application will be given. For further information address Rev. Mother Superior, F.M.M., St. Francis Sanatorium for Cardiac Children, Roslyn, Long Island, N. Y.

Society Honors Seven and Forty-Nine Members.—The Richmond County Medical Society feted seven physicians who have been members for forty years on April 9 at the fifty-third annual dinner of the society in Staten Island. The physicians are Drs. Charles L. Allers, Frederick Coonley, Charles E. Pearson, H. MacDonald Peggs, Robert N. Severance, Richard M. MacRae and Myron B. Morris. A plaque engraved with the names of forty-nine members who served in the armed forces was presented to Dr. Stanley C. Pettit, who represented the veterans.

The Health Examination. — The Community Service Society, 105 East Twenty-Second Street, has just published a pamphlet entitled The Health Examination, for public health nurses to use as a guide in family health service and to help them prepare individuals and families for going to doctors for health examinations. The pamphlet contains illustrations of various phases of the health examination and quotations from authorities who have expressed opinions on health examinations; also a copy of the form which the physician may fill out when the examination is given. The pamphlet, which has been revised up to January 1 of this year, sells at 25 cents each for orders under 100 copies and 20 cents for orders above that number.

NORTH CAROLINA

Dr. Edward McGavran Appointed Dean.—Dr. Edward G. McGavran, professor of public health and preventive medicine, University of Kansas School of Medicine, Lawrence-Kansas City, Kan., has been appointed dean of the School of Public Health, University of North Carolina, Chapel Hill, effective September 1. Dr. McGavran received his medical degree from Harvard Medical School, 1928, and his M.P.H. from the Harvard School of Public Health. From 1934 to 1939 he was director of health and county health officer in Hillsdale, Mich., for the W. K. Kellogg Foundation, which he served the following year on a survey of health conditions in the sugar industry in Hawaii. He served as health commissioner of St. Louis County, Mo., 1941-1946.

PENNSYLVANIA

Diarrhea Epidemic in Infants.—Twenty-two babies in Pennsylvania have died since March 1 of gastroenteritis, 18 of them in Allentown, 4 in Philadelphia and 6 others in Somerville, N. J. At Temple University Hospital, Philadelphia, 32 children brought from Allentown and being cared for in an isolated ward were reported in "good condition." At Somerville 10 others are still ill in an isolated ward of Somerset Hospital but are not regarded as in a serious condition.

Philadelphia

Residents Banquet at Atlantic City.—The Association of Resident and Ex-Resident Physicians of the Philadelphia General Hospital will hold its first annual alumni reunion banquet at the Centennial Celebration of the A. M. A. in Atlantic City June 11 at 7 o'clock at Haddon Hall. Invitations have been issued to all members of the association; any who fail to receive them may make reservations through Dr. Robert C. McElroy, secretary-treasurer, 133 South 36th Street, Philadelphia 4.

Pittsburgh

Pittsburgh Surgical Society.—The Pittsburgh Surgical Society held a meeting at Mellon Institute Friday, May 16, to which all members of the Allegheny County and surrounding medical societies were invited. Dr. Edward M. Kent, St. Louis, spoke on "Bronchogenic Carcinoma," and Dr. Samuel P. Harbison, Sewickley, Pa., discussed "Reparative Surgery of Soft Part Wounds."

RHODE ISLAND

New County Society.—The house of delegates of the state medical association has issued a charter to the physicians of Bristol County to permit them to form a constituent association in that area. The action removes the Bristol delegation from the jurisdiction of the Providence Medical Association. Dr. Marcius H. Merchant is the first president of the new association.

TEXAS

Grant for Experimental Study. — A special grant of $10,000 has been approved by the U. S. Public Health Service for the support of a study of experimental vascular syphilis under the direction of Dr. Chester N. Frazier in the laboratories of the department of dermatology and syphilology of the University of Texas Medical Branch, Galveston.

University News.—Ardzroony Packchanian, Ph.D., associate professor of bacteriology and parasitology at the University of Texas Medical Branch, Galveston, left for Mexico April 21. He was a visiting professor of bacteriology and tropical medicine at the Escuela de Midicina de Nuevo León in Monterrey and lectured on leishmaniasis, trypanosomiasis, spirochetosis and tularemia. The Mexican government has also invited him to do field research. He was expected to return to Galveston about May 10.

Texas Medical Center.—A campaign is in progress to raise money needed to construct the $2,500,000 St. Luke's Hospital, which is to be built by the Episcopal Church as a part of the Texas Medical Center at Houston. Mr. and Mrs. R. H. Cullen, Houston, have given $1,000,000, and $500,000 has been received from the M. D. Anderson Foundation of Houston. A 6 acre site is a further gift from the Anderson Foundation. The hospital will have 250 beds. The Texas Medical Center is expected to include the Baylor Medical School, University of Texas Dental School, Hermann Hospital, a children's hospital, tuberculosis hospital, nurses' training school, x-ray laboratory and pathologic laboratory, and specialized study for pediatrics, geriatrics and numerous other phases of medicine.

WISCONSIN

Honored for Service to Community.—Drs. Jean A. Jackson and Edward F. Butler, Mosinee, were honored at a testimonial dinner in March sponsored by the Mosinee Chamber of Commerce and the Lions Club in recognition of the doctors' long and faithful service to their community. Dr. Butler has spent his entire medical career, thirty-six years, in Mosinee, and Dr. Jackson moved to the city thirty years ago.

GENERAL

State Postgraduate Committees Meeting. — The next meeting of the Associated States Postgraduate Committees will be held June 11, 12:30 p. m., at Chalfonte-Haddon Hall, Atlantic City. The subject will be the scope of postgraduate programs offered by a state medical society.

Diploma Stolen.—Dr. Frederick S. Spearman of Williams, Ariz., a graduate of McGill University Faculty of Medicine, Montreal, Canada, reports that his medical diploma has been stolen and suggests that state medical boards be on the watch in case some one should attempt to register by means of it.

Loyola Alumni Meeting in Atlantic City.—The Medical Chapter of the Loyola University Alumni Association will hold a dinner for 200 alumni and their wives at the Chelsea Hotel in Atlantic City June 11 at 6:30. The main speaker will be Dr. James J. Smith, dean of Loyola University School of Medicine, Chicago. The New Jersey club president is Dr. I. Jerome Sobel of Passaic, N. J.

Metropolitan Says Our Health Is Best Ever.—Health in the United States was better in the first quarter of 1947 than ever before in the same period, according to Metropolitan Life Insurance Company records. Mortality for the first three months was 7.7 deaths for each thousand policyholders, or 9.8 per cent below the rate for the like months of 1946 and 3.6 per cent below the previous low for the period registered in 1945. New lows in death rates were registered for tuberculosis, the four principal communicable diseases of childhood as a group, syphilis and appendicitis.

Special Society Elections. — The Southern Society of Clinical Surgeons at a recent meeting elected Dr. Emmett B. Frazer, Mobile, Ala., president, and Dr. James White, Fort Worth, Texas, vice president.——The National Academy of Sciences at its annual meeting in Washington April 28-30 elected the following officers: president for a four year term, Alfred N. Richards, Sc.D., Ph.D., vice president in charge of medical affairs, University of Pennsylvania, Philadelphia, and secretary for a further four year term, Frederick E. Wright, Sc.D., Carnegie Institution, Washington, D. C.

American Urological Association Meeting.—The twenty-third annual meeting of the western section of the American Urological Association will be May 21-23 at the Ahwahnee Hotel, Yosemite Valley, Calif. Among the subjects of many scientific papers to be presented are streptomycin and the

urologist, surgical treatment of hypertension, urologic manifestations in early filariasis and the best method of removal for adenoma of the prostate. The president's address will be delivered May 22 at 1:30 by Dr. Dudley P. Fagerstrom, San Jose, Calif., on "Proliferative Tumors of the Ureter and Renal Pelvis, with Further Observations on the Significance of Epithelial Nests."

Institutes in Hospital Administration.—The American Hospital Association, 18 East Division Street, Chicago, will sponsor during the next six months a series of institutes of several days' duration on specialized phases of hospital administration. They will consist of talks, panel discussions and informal discussion of individual hospital contracts. The first institute, at the Continental Hotel, Chicago, May 19-23, on Hospital Pharmacy, will be co-sponsored by the American Pharmaceutical Association. The last of the series will be an institute for hospital trustees held in Chicago, December 1-5. Between these dates institutes will be held at various other cities on such subjects as public relations, personnel management, cost analysis and anesthetics.

Tuberculosis Physicians to Meet in Atlantic City.—The annual meeting of the American Academy of Tuberculosis Physicians will be held at the Hotel Dennis, Atlantic City, N. J., June 7. Under the leadership of Dr. Marcio M. Bueno, Rio de Janeiro, Brazil, a delegation from South America will attend. Included in the subjects of papers to be presented are Bagasse disease, case finding in the schools of Detroit, postoperative care following thoracic surgery, air embolism during pneumoperitoneum and safeguarding the undergraduate and graduate student of medicine against tuberculosis. Guest speakers will be Dr. Bueno, whose address will be "The Prevention of Tuberculosis," and Dr. Konrad Birkhaug, state department of health, Albany, N. Y., whose subject will be "Experimental and Clinical Basis for BCG Vaccination."

New Organization for Pathologists.—The College of American Pathologists, formed Dec. 13, 1946, has opened a temporary office at 203 North Wabash Avenue, Chicago. The objectives of the organization are (*a*) to foster the highest standards in education, research and the practice of pathology; (*b*) through study, education and improvement of the economic aspects of pathology to advance the science of pathology and to improve medical laboratory service; (*c*) to maintain the dignity, precision and efficiency of the specialty of pathology for the service of the common good. Membership is limited to pathologists certified by the American Board of Pathology. Junior membership is available to residents in pathology who have completed two years of their requirements for examination by the American Board of Pathology. Officers of the organization are Drs. Frank W. Hartman, Henry Ford Hospital, Detroit, president; Tracy B. Mallory, Massachusetts General Hospital, Boston, secretary-treasurer, and Melbourne G. Westmoreland, Chicago, executive secretary.

Gastroscopic Club to Meet at Atlantic City.—The third annual meeting of the American Gastroscopic Club is to be held at the Hotel Claridge, Atlantic City, June 8 at 9:30 a. m. Among the speakers will be Dr. Rudolf Schindler, Los Angeles, on "Differentiation of Benign and Malignant Gastric Ulcer"; Drs. Moses Paulson, Baltimore, and Eugene S. Gladsden, Washington, D. C., "Partial Gastrectomy: Clinical, Gastroscopic and Radiological Considerations"; Dr. Regis A. Wolff, Pittsburgh, "Gastroscopic Appearance of the Gastric Mucosa Before and After Vagus Resection"; Dr. Frank McGlone, Denver. "Observations on Gastritis Based on Experience in a General Hospital in the South Pacific"; Dr. I. Richard Schwartz, Brooklyn, "Gastroscopic Observations in Secondary Syphilis"; Dr. Cecil O. Patterson, Dallas, Texas, "Description of the Gastroscopic Appearance of Luetic Lesions in the Stomach," and Drs. Harry L. Segal and James S. Watson Jr., Rochester, N. Y., "Color Photography Through the Flexible Gastroscope." A business meeting and a luncheon will follow the scientific program with Dr. Henry L. Bockus, Philadelphia, the speaker.

Dr. Ross G. Harrison Receives Carti Medal.—Dr. Ross G. Harrison, professor emeritus, Osborn Zoological Laboratory, Yale University, New Haven, Conn., received the John J. Carti gold medal and award for 1947 at the annual dinner of the National Academy of Sciences, Washington, D. C., April 29. The award was conferred for the discovery that tissue cells may be grown outside the animal body and by the use of the discovery to demonstrate the manner of growth of nerve fibers, for long and distinguished service as investigator, teacher and councilor of students and for a statesmanly direction of the National Research Council. As a young man at Johns Hopkins University, Baltimore, he obtained striking experimental results in a study of the development of the nervous system. He first used the method of isolation of embryonic tissues in culture mediums and gave an ocular demonstration that the nerve fiber grows out from a single cell without the participation of accessory cells. This led to the procedure known as tissue culture, which has since been widely used in the differentiation, growth and behavior of cells under various conditions outside the body. Referring to Dr. Harrison's work on the nerve fiber, Dr. Florence R. Sabin, Denver, retired, has said "This epochal discovery, with all of the developments of the methods of studying living cells, is one of the most outstanding American contributions to scientific medicine and biology." Provision for the Carti Medal and Award was made by the American Telephone and Telegraph Company as a token of esteem on the occasion of the late John J. Carti's retirement from active service.

FOREIGN

Malaria Among the Moros.—The Associated Press reports that a malaria epidemic in Mindanao, Philippine Islands, is taking the lives of 800 to 1,000 Moros a month. Governor Louis R. Marohonbsar of Lanao province has appealed to the UNRRA and the Philippine government to help combat the spread of malaria among the 300,000 Moros inhabiting fertile uplands bordering the Lake Lanao region.

Reorganization of Japanese Medical Association.—The first issue of the *Journal of the Japanese Medical Association* to be published after its reorganization under democratic principles has come to this office and is printed in the Japanese language. The Japanese Medical Association previously had been a government agency for the control of the medical profession under which membership was compulsory by law and the government appointed the national and state (prefectural) presidents. The association has been reorganized under the guidance of the public health and welfare section, General Headquarters, Supreme Commander for the Allied Powers. It is now an association representing the medical association with voluntary membership which selects its own officers. Col. Crawford F. Sams, M. C., U. S. Army, chief of the public health and welfare section, writes that this process of turning an organization completely upside down has been a long and tedious one.

Palestine Society for Medical History.—The first conference of the Palestine Society for Medical History was held in Jerusalem April 7. On the following day lectures were continued at the Hebrew University. Among others, a paper presented by the late Dr. M. Meyerhof, Cairo, Egypt, entitled "Arabic Medicine Among Yemenite Jews," was read by Dr. D. A. Friedmann, editor, *Journal of the Palestine Medical Association*. The honorary president of this organization is Dr. Harry Friedenwald, Baltimore. The address of the organization is Street of Prophets, Baltinester House, Jerusalem. The object of the Palestine Society for Medical History is research into and propagation of knowledge in medical history and all its branches, particularly research in Jewish medical history. The society will have its own quarterly publication and a library with old manuscripts, especially photostats of manuscripts. It will support research workers and distribute a prize for the most important paper of the past year.

CORRECTIONS

Price of Book.—Under Book Notices in THE JOURNAL, April 26, page 1319, the price of the book "Pharmacy's Part in Society," by George Urdang, was given as $1.05. The price of the book is $5.

The Repair of Arteriovenous Fistulas.—In the paper by Heringman, Rives and Davis (THE JOURNAL, March 8, p. 663) the footnote under the title should read "From the Department of Surgery, Louisiana State University School of Medicine, and the Surgical Services of Charity Hospital of Louisiana and Touro Infirmary." On page 667 the last sentence of the legend for figure 8 should begin "Although this is not an arteriovenous aneurysm . . ."

Marriages

MARK STILES WELLINGTON, St. Petersburg, Fla., to Miss Patricia Anne Sampson of Plymouth, Mass., Dec. 10, 1946.

CHARLES E. THOMPSON, Omaha, to Miss Martha Jane Wheat of Belleville, Ill., Dec. 10, 1946.

SIDNEY MARTIN SAMIS to Miss Shirley Gladys Aronow, both of New York, March 16.

SAMUEL SHERMAN to Miss Constance Sara Sameth, both of New York, February 16.

Deaths

Isidore William Held ✠ New York; born in Boryslav, Austria, May 15, 1876; Jefferson Medical College of Philadelphia, 1902; from 1935 to 1941 clinical professor of medicine at the New York University College of Medicine, where the I. W. Held Fellowship Fund had been established in his honor; specialist certified by the American Board of Internal Medicine; fellow of the American College of Physicians; member of the National Gastroenterological Association, American Heart Association, American Association for the Advancement of Science, Association of Military Surgeons of the United States and others; consulting physician and from 1929 to 1945 attending physician at the Beth Israel Hospital, where the pathologic laboratory is named in his honor; consulting physician at the Nathan and Miriam Barnet Memorial Hospital, Paterson, N. J., Israel Zion, Beth Moses and Beth El hospitals in Brooklyn, Jewish Memorial Hospital and the Rockaway Beach (N. Y.) Hospital; major, medical reserve corps, not on active duty; co-author of "Peptic Ulcer—Its Diagnosis and Treatment"; died in the Mount Sinai Hospital March 2, aged 70, of cardiovascular disease and acute pyelonephritis.

Cornelius Albertus Hospers ✠ Chicago; School of Medicine of the Division of the Biological Sciences, University of Chicago, 1932; interned at University of Chicago Clinics; specialist certified by the American Board of Pathology, Inc.; member of the American Association of Pathologists and Bacteriologists and the American Society of Clinical Pathologists; on the staffs of the Holy Cross and South Chicago Community hospitals; served as a lieutenant colonel in the medical corps, Army of the United States, during World War II; died February 20, aged 42, of coronary thrombosis.

Robert Brian Archibald ✠ Bedford Hills, N. Y.; Dalhousie University Faculty of Medicine, Halifax, N. S., Canada, 1927; president, past vice president and secretary of the Westchester County Medical Society; at one time health officer of Covington County, Ala.; affiliated with the Northern Westchester Hospital in Mount Kisco; on the editorial board of the *Westchester Medical Bulletin*; died February 7, aged 46.

Herman Charney ✠ Greeley, Colo.; St. Louis College of Physicians and Surgeons, 1926; died in the Montefiore Hospital in New York February 5, aged 45, of recurrent brain tumor.

Otto H. Duker, Baltimore; College of Physicians and Surgeons, Baltimore, 1904; died in St. Joseph's Hospital January 19, aged 79, of arteriosclerosis and thrombosis of femoral artery.

Harry Charles Durkee, Woodstock, Ill.; State University of Iowa College of Medicine, Iowa City, 1906; member of the American Medical Association; died February 16, aged 67, of cerebral hemorrhage.

George Spaulding Edwards, Santa Barbara, Calif.; University of Southern California School of Medicine, Los Angeles, 1943; interned at the Los Angeles County Hospital in Los Angeles; instructor in physiology at his alma mater; served during World War II; died in January, aged 29, of hemorrhagic consolidation of lungs due to pharyngeal hemorrhage during syncope of unknown etiology.

C. Bryant Elkins, Springfield, Mo.; Missouri Medical College, St. Louis, 1885; member of the American Medical Association; honorary member of the Missouri State Medical Association; died in St. John's Hospital February 25, aged 85, of coronary thrombosis.

Daniel James Ellison ✠ Lowell, Mass.; Tufts College Medical School, Boston, 1908; member of the New England Obstetrical and Gynecological Society; served during World War I; past president of the Middlesex North District Medical Society; affiliated with the Lowell General, St. John's and St. Joseph's Hospitals; died February 14, aged 62, of cerebral hemorrhage.

Charles William Eustace ✠ Buffalo; University of Buffalo School of Medicine, 1910; for many years chief examiner in the area for the Travelers Insurance Company of Hartford; awarded certificate of merit for service given Selective Service System; died February 9, aged 69, of coronary thrombosis.

Lee Thaddeus Ferrell, Albuquerque, N. M.; University of Nashville (Tenn.) Medical Department, 1911; served during World War I; for many years on the staff of the Veterans Administration Center, where he died February 3, aged 67, of coronary occlusion.

George Earl Fortmiller, Albany, Ore.; University of Oregon Medical School, Portland, 1918; formerly city and county health officer; on the staff of the Albany General Hospital, where he died February 19, aged 55, of heart disease.

Sanford Edwin Gaines ✠ Sparta, Tenn.; University of Tennessee College of Medicine, Memphis, 1890; an Affiliate Fellow of the American Medical Association; for many years county health officer; past president of the Upper Cumberland Medical Society; on the staff of the White County Hospital; died February 19, aged 78, of myocarditis.

Edward Francis Garraghan ✠ Chicago; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1901; at one time on the faculty of Rush Medical College; on the staffs of the Columbus Memorial Hospital and St. Joseph's Hospital, where he died March 10, aged 73, of carcinoma of the pancreas.

John Aldridge Gibson ✠ Leesburg, Va.; University of Maryland School of Medicine, Baltimore, 1901; served as vice president of the Medical Society of Virginia and as president of the Loudoun County Medical Society; affiliated with the Loudoun County Hospital, where he died March 10, aged 70, of carcinoma of the gallbladder.

Guy Aubrey Gowen, Chicago; Northwestern University Medical School, Chicago, 1896; member of the American Medical Association; died March 9, aged 77, of hypertension and cerebral hemorrhage.

John Denton Green, Brookville, Miss.; Loyola University School of Medicine, Chicago, 1918; member of the American Medical Association; served as president of the North East Mississippi Thirteen County Medical Association and as health officer of Noxubee County; died in the Methodist Hospital, Memphis, Tenn., February 4, aged 67, of carcinoma of the cecum.

Laborn James Harley, Atlanta, Ga.; University of Nashville (Tenn.) Medical Department, 1900; served during World War I; died in Veterans Hospital number 48, February 16, aged 72, of cerebral thrombosis and hypertensive heart disease.

Frank Crawford Hayes, Camden, Ill.; George Washington University School of Medicine, Washington, D. C., 1905; at one time connected with the Indian Service; died in the Blessing Hospital, Quincy, February 24, aged 76, following the removal of an infected kidney.

Hamilton Worth Hewit, Lincoln, Neb.; Rush Medical College, Chicago, 1877; died in the Lincoln General Hospital February 18, aged 96, of arteriosclerosis.

John Joseph Hill, Forest Hills, N. Y.; Fordham University School of Medicine, New York, 1912; medical officer of the New York Fire Department; served on the staffs of the Beekman Street, Bellevue and St. Joseph's hospitals, all in New York; died in the Bronx Hospital, New York, February 21, aged 62, of coronary thrombosis.

Richard Gordon Holcombe, Lake Charles, La.; Tulane University of Louisiana, New Orleans, 1906; member of the American Medical Association; on the staff of St. Patrick's Hospital; died February 5, aged 65, of cerebral hemorrhage.

Richard M. Howe, St. Petersburg, Fla.; Eclectic Medical Institute, Cincinnati, 1889; died in St. Anthony's Hospital March 3, aged 81, of myelogenous leukemia.

Jesse William Ingram, Walla Walla, Wash.; University of Nashville (Tenn.) Medical Department, 1902; member of the American Medical Association; past president of the Walla Walla Valley Medical Society; served as treasurer of the state board of medical examiners; for many years physician for the state penitentiary; served overseas during World War I; lieutenant colonel, medical reserve corps, not on active duty; formerly county health officer; died in the Veterans Hospital, American Lake, February 22, aged 71, of organic heart disease.

Gabriel Joseph Jack ✠ North Haven, Conn.; Boston University School of Medicine, 1907; fellow of the American College of Surgeons; on the staff of the Grace Hospital in New Haven; died February 6, aged 63, of coronary occlusion.

John Greenwood Jennings ✠ Boston; Tufts College Medical School, Boston, 1915; member of the New England Ophthalmological Society; flight surgeon during World War I; served on the staffs of the Massachusetts Eye and Ear Infirmary in Boston and the Waltham (Mass.) Hospital, where he died February 17, aged 58, of internal hemorrhages.

Griffith Smith Jones, Genesee Depot, Wis.; University of Pennsylvania School of Medicine, Philadelphia, 1917; member of the American Medical Association; at one time school health officer in Wauwatosa; died in the Wisconsin General Hospital in Madison February 7, aged 63, of postoperative pneumonitis.

Lewis J. Jones, Stanford, Ky.; Hospital College of Medicine, Louisville, 1902; member of the American Medical Association; secretary-treasurer of the Lincoln County Medical Society; veteran of the Spanish-American War; died February 13, aged 66, of heart disease.

Shelby Justus, Swifton, Ark. (licensed in Arkansas in 1909); member of the American Medical Association; died in Searcy February 16, aged 66, of coronary thrombosis and duodenal ulcer.

Roscoe Romeo Kahle ✠ Columbus, Ohio; Starling Medical College, Columbus, 1904; on the staffs of the Grant and St. Anthony's hospitals; died February 7, aged 68, of coronary thrombosis.

Ira Nelson Kilburn, Springfield, Mass.; Dartmouth Medical School, Hanover, N. H., 1911; member of the American Medical Association; member of the Springfield Academy of Medicine; on the staffs of the Wesson Memorial and Springfield hospitals; died February 2, aged 61, of cerebral hemorrhage and arteriosclerosis.

Ray Porter Kile, Rockford, Ill.; University of Illinois College of Medicine, Chicago, 1913; member of the American Medical Association and the American Urological Association; died in Tucson, Ariz., February 19, aged 62, of intestinal obstruction.

Harvey Thomas Little ✠ Chicago; Loyola University School of Medicine, Chicago, 1916; member of the staffs of the Loretto and County hospitals; died in Hollywood, Calif.; March 10, aged 52, of coronary thrombosis.

Myrtle Ethel Spencer Lockwood, National City, Calif.; American Medical Missionary College, Battle Creek, Mich., and Chicago, 1900; member of the American Medical Association; on the staff of the Paradise Valley Sanitarium and Hospital, where she died February 5, aged 70, of carcinoma of the tongue.

Albert H. Macbeth, Fort Wayne, Ind.; University of Buffalo School of Medicine, 1892; member of the American Medical Association; veteran of the Spanish-American War; served as a staff member of St. Joseph's, Lutheran and Methodist hospitals; formerly health commissioner; died March 10, aged 83.

Oscar Hunter McClung, Lexington, Va.; University of Virginia Department of Medicine, Charlottesville, 1902; member of the American Medical Association; on the staff of the Jackson Memorial Hospital; died February 2, aged 67, of coronary thrombosis.

Alva Edgar McReynolds, El Paso, Ill.; University of Maryland School of Medicine and College of Physicians and Surgeons, Baltimore, 1915; member of the American Medical Association; served overseas during World War I; during World War II received the Congressional Medal of Merit for work in civilian defense; died February 6, aged 70, of coronary occlusion.

U. Rial McReynolds, Knox City, Mo.; St. Louis University School of Medicine, 1904; member of the American Medical Association; died February 12, aged 66, of aortic stenosis.

John A. May, Manchester, Iowa; Chicago Homeopathic Medical College, 1890; died recently, aged 83, of coronary sclerosis.

Paul Mazzuri, New Orleans; Medical Department of Tulane University of Louisiana, New Orleans, 1897; veteran of the Spanish-American War; an associate of Walter Reed during the famous yellow fever experiments in Cuba in 1900; formerly assistant medical director of the New York Life Insurance Company; died in the Touro Infirmary March 9, aged 81, of arteriosclerosis and bronchopneumonia.

Benjamin Franklin Myers, Chambersburg, Pa.; Baltimore Medical College, 1892; member of the American Medical Association; past president of the Franklin County Medical Society; served as county jail physician; on the staff of the Chambersburg Hospital, where he died February 17, aged 78, of carcinoma of the stomach.

Mary Eva Gill Noble, Brookline, Mass.; Tufts College Medical School, Boston, 1902; member of the American Medical Association; specialist certified by the American Board of Psychiatry and Neurology; for many years on the staff of the Boston State Hospital; died in the New England Hospital, Boston, February 16, aged 75, of cerebral hemorrhage.

John T. O'Mara ✠ Baltimore; University of Maryland School of Medicine, Baltimore, 1903; secretary of the board of medical examiners of Maryland for twenty-two years; member of the Federation of State Medical Boards of the United States; fellow of the American College of Physicians; on the staff of the Bon Secours and St. Agnes hospitals; died February 3, aged 66, of cerebral hemorrhage.

Thomas Edward Phillips, Alligator, Miss.; Tulane University of Louisiana, New Orleans, 1910; member of the American Medical Association; served during World War I; died in the Clarksdale (Miss.) Hospital February 14, aged 59, of heart disease.

Joseph B. Potsdamer, Philadelphia; Jefferson Medical College of Philadelphia, 1879; member of the American Medical Association; served on the staff of the Jewish Hospital; died February 14, aged 89, of pneumonia.

Addison Webster Preston ✠ Visalia, Calif.; University of Vermont College of Medicine, Burlington, 1907; for many years city and county health officer; director of the Bank of America; served as a member of the school board; died February 5, aged 63, of pyelonephritis.

Joseph Larcher Ravitts, Montezuma, Iowa; Chicago College of Medicine and Surgery, 1914; member of the American Medical Association; served during World War I; examining physician for the Poweshiek County Selective Service Board during World War II; died February 5, aged 62, of cerebral hemorrhage.

Maurice Joseph Reidy ✠ Winsted, Conn.; Columbia University College of Physicians and Surgeons, New York, 1910; fellow of the American College of Surgeons; affiliated with the Litchfield County Hospital; died in St. Francis Hospital, Hartford, February 6, aged 62, of cerebral thrombosis.

Knight Reynolds ✠ Cumberland, Md.; University of Maryland School of Medicine and College of Physicians and Surgeons, Baltimore, 1925; on the staff of the Memorial Hospital; died February 5, aged 47.

Abbott Satterthwait, Laguna Beach, Calif.; Hahnemann Medical College and Hospital, Philadelphia, 1897; died February 11, aged 73.

Charles Hamilton Schultz ✠ Johnstown, Pa.; George Washington University School of Medicine, Washington, D. C., 1922; served during World War I; during World War II served as a medical examiner for a local selective service board; for many years affiliated with the Memorial and Mercy hospitals; died February 6, aged 52.

Frank Robert Sedgley, Redwood City, Calif.; Boston University School of Medicine, 1902; member of the American Medical Association and the Massachusetts Medical Society; fellow of the American College of Surgeons; formerly affiliated with the U. S. Public Health Service Reserve and on the staffs of various Veterans Administration hospitals; died February 13, aged 67, of coronary occlusion.

Monroe Shaul, Boonville, Ind.; Kentucky School of Medicine, Louisville, 1883; died February 15, aged 93, of senility.

William Mark Sherman, St. Louis; St. Louis University School of Medicine, 1904; for many years medical examiner for the John Hancock Mutual Life Insurance Company; died in the City Hospital February 7, aged 76, of arteriosclerosis and cerebral thrombosis.

George W. Sholler ✠ Melrose Park, Pa.; University of Pennsylvania Department of Medicine, Philadelphia, 1892; past president of the Philadelphia County Medical Society; affiliated with the Jewish Hospital and Germantown Hospital in Philadelphia, where he died February 3, aged 76, of coronary occlusion.

William Walter Slayden, Waverly, Tenn.; University of the South Medical Department, Sewanee, 1897; director and formerly vice president of the Citizens Bank of Waverly; died in St. Petersburg, Fla., February 10, aged 74, of leukemia and pneumonia.

Adela Jeanette Smith, New York; New York Homeopathic Medical College and Flower Hospital in New York in 1920; retired in 1943 after twenty-eight years as assistant director of health education in charge of the division of physically handicapped children in the city's public schools; died March 2, aged 74.

W. Edgar Smith, Dallas, Texas; Southern Methodist University Medical Department, Dallas, 1914; member of the American Medical Association; fellow of the American College of Surgeons; served during World War I; on the staff of St. Paul's Hospital; died February 2, aged 55, of coronary occlusion.

Albert L. Sparks, Springfield, Mo.; Ensworth Central Medical College, St. Joseph, 1906; also a druggist; died February 2, aged 69.

Paul Edward Spratlin, Washington, D. C.; Denver College of Medicine, 1892; died February 3, aged 85, of hypertensive heart disease.

Harry J. Stauffer, Jeannette, Pa.; Jefferson Medical College of Philadelphia, 1895; member of the American Medical Association; died February 2, aged 81, of cerebral hemorrhage.

Roy George Stevens ✠ Sioux Falls, S. D.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1905; fellow of the American College

of Surgeons; on the staffs of the McKennan and Sioux Valley hospitals; died February 20, aged 66.

Patrick Francis Strapp, Seymour, Conn.; Bellevue Hospital Medical College, New York, 1892; served as a member of the board of education; died February 5, aged 81.

Francis Leslie Sullivan ⊕ Scotia, N. Y.; Albany Medical College, 1924; fellow of the American College of Surgeons; specialist certified by the American Board of Surgery; member of the House of Delegates of the American Medical Association, 1944, 1945 and 1946; served on the staffs of the City, Ellis and the Eastern New York Orthopedic hospitals, all in Schenectady; died February 15, aged 50, of coronary thrombosis.

Gustavus Adolphus Sulzer, Columbus, Ohio; University of Pennsylvania Department of Medicine, Philadelphia, 1892; died in Mount Vernon February 20, aged 78.

Charles Edward Taylor, Tacoma, Wash.; University of Oregon Medical School, Portland, 1897; formerly affiliated with the civilian conservation corps, Western State Hospital at Fort Steilacoom and the Eastern State Custodial School at Medical Lake; died in a local hospital February 5, aged 75.

William Girard Thompson, Enid, Miss.; Hospital College of Medicine, Louisville, Ky., 1894; member of the American Medical Association; died in the Grenada Hospital in Grenada, Miss., February 11, aged 74, of heart disease.

James Richard Tubman, Washington, D. C.; Columbian University Medical Department, Washington, D. C., 1895; member of the American Medical Association; died February 17, aged 79.

Edgar Lee West ⊕ Trenton, N. J.; University of Pennsylvania Department of Medicine, Philadelphia, 1905; fellow of the American College of Surgeons; served during World War I; on the staff of St. Francis Hospital; died February 6, aged 67, of lymphosarcoma.

Walter Charles Wilhelmj ⊕ East St. Louis, Ill.; St. Louis University School of Medicine, 1904; past president of St. Clair County Medical Society; member of the American Urological Association; served as acting director of the East Side Health District; chief of staff, St. Mary's Hospital; affiliated with Christian Welfare Hospital; trustee and past president of the public library; died in Hot Springs, Ark., February 23, aged 65.

James Wallace Wilkes ⊕ Columbia, Tenn.; Cornell University Medical College, New York, 1900; past president of the Tennessee Otolaryngology Association; past vice president of the Tennessee State Medical Association; past president of the Maury County Medical Society; died February 19, aged 70, of heart disease.

Reuben Hamilton Williams, Moberly, Mo.; National University of Arts and Sciences Medical Department, St. Louis, 1916; member of the American Medical Association; served during World War I; county coroner and city physician; died February 6, aged 61, of coronary disease.

Howard Edwin Wright, Princeton, N. J.; University of Pennsylvania Department of Medicine, Philadelphia, 1893; medical inspector in the borough of Princeton public schools; member of the medical staff of Princeton University; medical adviser to private and parochial schools; on the staff of the Princeton Hospital, where he died February 18, aged 78.

COMDR. HAROLD E. STEDMAN
(MC), U. S. N. R., 1900-1945

CAPT. EMMET ROBINSON SPICER
M. C., A. U. S., 1915-1945

LIEUT. (jg) JOSEPH A. MORTON
(MC), U. S. N. R., 1915-1944

KILLED IN ACTION

Harold Edwin Stedman, Garden City, N. Y.; University of Michigan Medical School, Ann Arbor, 1928; member of the American Medical Association and the American Urological Association; fellow of the American College of Surgeons; specialist certified by the American Board of Urology; interned at the U. S. Naval Hospital in Brooklyn; served a residency at the Jersey City Hospital in Jersey City, N. J., and the New York Hospital in New York; on the staffs of the Meadowbrook Hospital in Hempstead and the Nassau Hospital in Mineola; at one time an officer in the regular U. S. Navy; entered the medical corps of the U. S. Naval Reserve in November 1940 as a lieutenant commander; promoted to commander; died on the U. S. S. *Pinckney* April 29, 1945, aged 45, of wounds received in action.

Emmet Robinson Spicer, Goldsboro, N. C.; Cornell University Medical College, New York, 1941; interned at the John T. Mather Memorial Hospital in Port Jefferson, N. Y., and the Bellevue Hospital in New York; captain, medical corps, Army of the United States; killed in action in Corregidor Feb. 16, 1945, aged 29.

Joseph Anselm Morton, Rochester, N. Y.; University of Rochester School of Medicine and Dentistry, Rochester, N. Y., 1942; interned at the Genesee Hospital; began active duty as a lieutenant (jg) in the medical corps of the U. S. Naval Reserve on July 1, 1943; killed in an explosion of Kamikaze plane Nov. 1, 1944, aged 29, while ministering to wounded seamen on deck of U. S. destroyer *Anderson* during the battle of the Philippine Islands.

Foreign Letters

LONDON

(From Our Regular Correspondent)

April 5, 1947.

The Birth Rate Reaches Replacement Level

A rise in the birth rate during the war and subsequently has been reported in THE JOURNAL from time to time, but the rate was always below the level of replacement—a fact which caused much concern to writers on the subject. Now at last it is announced that the replacement level was reached, for the first time in twenty-four years, in the last quarter of 1946. The deaths registered in that quarter for England and Wales numbered 122,173, representing a death rate of 11.3 per thousand of population, compared with 11.4 for the corresponding quarter of 1945. Deaths of children under 1 year of age numbered 9,139, giving a provisional mortality rate of 44 per thousand of related live births. This is 7 per thousand below the average of the ten preceding years 1936-1945. The "natural increase of population" (the excess of births over deaths for the quarter) was 99,718.

The number of persons married during the quarter numbered 191,256, which was 20,187 more than the average of the corresponding quarters of the preceding five years, 1941-1945. The birth rate for the whole of 1946 was 19.1 per thousand, the highest since 1923.

The approximate reproduction rate for the year was 1,102, which was 10 per cent in excess of that required to maintain the population. This is the first time that the rate has reached the replacement level since 1922, when the corresponding figure was 1,013. Infant mortality was the lowest ever recorded in this country, 43 per thousand, being 2 per thousand below that of 1944, the previous lowest.

A Medical Service for Students

A remarkable free medical service for students has been maintained by Edinburgh University for seventeen years. They are entitled to medical examination on admission and at other times when they wish. They are also encouraged to engage in physical education. Lately x-rays of the chest have been included in the examination. During the present year 752 (about 60 per cent) of the male students have been examined, and about the same proportion of women. Among the males 8 cases of pulmonary tuberculosis were found, the subjects being unaware of the existence of the disease. In addition to medical examinations, consultations are held three times a week for students wanting advice, and those unfit to attend can obtain domiciliary treatment. The medical service works in cooperation with the students' social service. It is devised for the benefit of those whose homes are not in Edinburgh. Local students are encouraged to use their family physician rather than the university medical service. The principal Edinburgh hospital, the Royal Infirmary, has a special students' ward. There is also a dental service organized through the Dental Hospital. It is hoped to have a university sick dormitory in one of the university hospitals, and a scheme for the full care of students suffering from tuberculosis is being considered.

The Perennial Character of Hughlings Jackson's Teaching

Of all the great men whose work is commemorated by lectures periodically delivered, Hughlings Jackson has a peculiar claim. His pioneer work in laying the foundations of neurology still remains unique. It is curious that, while neurologists are unanimous in his praise, none of them have attempted any work in his peculiar vein, though so much has been accomplished on other lines. Is this because he completely worked out that vein or because, though there have been many great neurologists, none have had the peculiar cast of mind required for work on Jackson's lines? This was simply the application of Herbert Spencer's philosophy of evolution to neurology. In the whole of medicine there is nothing comparable. Great teachers often indulge in philosophic reflections, but that is a very different thing from applying to medicine a definite philosophical system.

Permanence of Concepts

At the Section of Neurology of the Royal Society of Medicine the tenth Hughlings Jackson lecture was delivered by Professor E. D. Adrian, F.R.S. He began with a reference to Herbert Spencer as a philosopher who was today forgotten but who molded the thought of his Mid-Victorian generation and whose influence was shown in the development of neurology by his great admirer Hughlings Jackson. The theories and predictions of Hughlings Jackson were based on Spencer, and the illumination which they gave to neurology was as brilliant today as ever. Hughlings Jackson was one of the great clinicians of all time, a scientific observer of the first rank, and his theses were still fresh and individual and none the worse for our advancing knowledge. His ideas were cast in terms so general that they applied whatever the detailed structure of the nervous system might prove to be. Many of his writings were published before the neuron theory had been properly formulated. Most of the data of clinical neurology were available then as now, but he had not got our great mass of knowledge of cell structure and physiology. We now had no Spencer to give us an accommodating framework and no Jackson to fill in the picture, but we ought to survey our knowledge from time to time in the light of Jackson's theories.

Jackson described the evolution of the nervous system as proceeding from the lowest well organized centers to the highest least organized, from the most simple to the most complex, from the most automatic to the most voluntary. An example of low level complexity and the highest degree of organization was the stretch reflex. A higher level of complexity was shown in the flexion reflex in response to pain, in which the synaptic delay was twice as long as in the stretch reflex. The motor discharge was no longer confined to one pathway.

Pasteur Exhibition to Be Held in London

A Pasteur exhibition is to be held at the Science Museum, South Kensington, London, from April 10 to May 26. It has been arranged with the assistance of the cultural relations department of the French foreign office by the Palais de la Découverte in Paris, where it has recently been on show. It will include a chronological account of the chemical and biologic work of Louis Pasteur on fermentation, putrefaction, the spontaneous generation of life and the germs of numerous diseases in men, animals and plants. A section will deal with the Pasteur institutes established throughout the world for the preparation of serums and vaccines for the combating of epidemics.

Sir Joseph Barcroft

The physiologist Sir Joseph Barcroft, F.R.S., has died at the age of 74 years. After a distinguished career as a student and lecturer he became professor of physiology at Cambridge in succession to Langley in 1926. His researches on oxygen carriage in the blood are classic, and every student learns about his blood-gas apparatus, his oxygen dissociation curves and his classification of the varieties of anoxia. In a long controversy with the physiologist J. S. Haldane he maintained that the passage of gases through the alveolar epithelium of the lungs is a simple physical process and that even under adverse conditions the lungs cannot take up oxygen unless its pressure in the air is higher than that in the blood. In 1937 he retired from the Cambridge chair of physiology and, though already famous all over the world, at the age of 69 he entered a new sphere becom-

ing director of the unit of animal physiology for the Agricultural Research Association. He introduced new technics for observing developing embryos and took up the problem of the oxygen supply of the fetus in utero. The first volume of his Researches on Prenatal Life has only recently been published. Most of the work was done on fetal sheep. There are experiments showing the variation in fats and sugars as between the maternal and fetal blood.

PARIS

(From Our Regular Correspondent)

April 18, 1947.

Vitamins in Aerosols in Treatment of Tuberculosis

Professor Léon Binet and H. Bour have used oxygenosols of vitamin D_2 in the treatment of serious pulmonary tuberculosis. Of 10 patients treated in this way, 6 (among whom were 2 with miliary tuberculosis and 1 with chronic phthisis in its terminal stage) did not respond. Four were obviously transformed. In the 4 patients the return of temperature to normal has been observed and by 2 the return to normal of the sedimentation rate. Cholesterol, which had diminished, regularly increased up to almost normal figures. Sputum diminished and became more fluid. On the whole, the inhalations of aerosols of vitamin D_2 have a general action, which enables the lesions to die away and then cicatrize. A mechanical therapy which could not be attempted previously becomes applicable. After a previous observation of eight days the patient receives the first day one to two inhalations of 5 mg. of vitamin D_2 and then three inhalations per day, which are continued up to a total dose of 700 to 750 mg. The treatment therefore lasts about fifty days. The authors have used vitamin D_2 in an alcoholic solution. Every week, during treatment, they controlled the weight, the urea content and the calcium in the blood and urine; they also made a blood cell count and a differential leukocyte count.

Vitamin D_2 in Large Doses and Calcium Therapy in Tuberculosis of Adults

At one of the latest meetings of the Société des hôpiteaux médicale de Paris H. Gounelle and M. Bachet reported their results in the treatment by vitamin D_2 orally administered in pulmonary tuberculosis without renal deficiency. To large doses of vitamin D_2 the authors have added calcium and a diet rich in milk and its products. In 3 cases the evolution was obviously modified and the general condition remarkably improved. In 2 patients, surgical intervention could be considered and in the third the important cavities have disappeared. On the first sign of hypervitaminosis, clinical as well as humoral, the treatment is to be interrupted; the authors confirm that the calcemia generally precedes azotemia; the intramuscular route is best tolerated, but its efficacy is still under study.

A New French Medical Society

A French medical society of pathology of the respiratory system has just been created at the suggestion of Dr. Ameuille of Paris. Its aim is the study of nontuberculous illness of the respiratory system. The organ of the society will be the *Journal français de médecine et de chirurgie thoraçique.*

The twenty-sixth Congress of Medicine will take place in Paris on the 16th, 17th and 18th of October under the presidency of Professor Lemierre. The program will include papers on genetics, antihistaminics and cysts of the lungs.

Death of Pierre Janet

Professor Pierre Janet, psychiatrist, has died at the age of 87. Together with Freud, he had been a disciple of Charcot. He was the author of classic works on psychiatric automatism, hysteria, neurosis and fixed ideas; we are indebted to him for our ideas concerning psychasthenia.

BRAZIL

(From Our Regular Correspondent)

RIO DE JANEIRO, April 12, 1947.

Immunity in American Trypanosomiasis

Drs. Julio Muniz and Gilberto de Freitas, from the Oswald Cruz Institute, Rio de Janeiro, reported results of serologic tests on samples of blood serum from 6 cases of acute trypanosomiasis (Chagas' disease) and from 211 chronic cases. With this material they undertook to advance the study of humoral immunity in the disease.

The serums from the 6 acute cases obtained at different times after onset of the infection (fifteen to forty days) strongly fixed the complement in titers varying from 1:40 to 1:160. The agglutinating strength of the serums from the acute cases varied between the titers of 1:2,560 and 1:20,000, and they all strongly reacted in the precipitation test (ring test) within ten minutes. The precipitation test proved positive every time the serums agglutinated at a titer higher than 1:640. About 80 per cent of the serums from the chronic cases were able to fix the complement at the dosage of 0.05 Gm. at varying intensity. Included in this total was a case in which the infection dated back more than thirty years. In 85 per cent of those cases an agglutinating strength was registered in titers varying from 1:160 to 1:2,560. The precipitin reaction (ring test) was positive in 18 per cent of the cases. The serum from the patient whose infection dated back more than thirty years agglutinated at the titer of 1:640.

Inhibitory Action of Phenol on Histamine

Dr. Celso Barroso, director, São Paulo Institute for Allergy, has published a report on his experimental and clinical study on the inhibitory action of phenol on muscle contraction induced by histamine injection. In 1943, when Barroso attempted, with the collaboration of Rocha e Sílva, the passive transference of antibodies from man to guinea pig, as had been proved possible by others, he failed to obtain similar results. One explanation for failure was supposed to be the presence of phenol in the Coca's solution used. This fact led the author to perform studies which proved conclusively that phenol should be included among the substances with inhibitory action on the contraction of plain muscles induced by histamine. When previously added to Tyrode's solution that bathes isolated portions of guinea pig intestine, phenol inhibits the toxic effects of histamine. When added to the same solution in which there is a fragment of guinea pig ileus already contracted by the effect of histamine, phenol causes the immediate and total relaxation of the organ, comparable to a similar effect obtained by the use of epinephrine or atropine. An important point disclosed by Barroso's experiments is that phenol cannot inhibit vasodilatation caused by histamine. An intradermic injection of a mixture of histamine and phenol acts like an injection of a pure solution of histamine, causing the same vasodilatation. Barroso was able to verify that it is possible to increase the therapeutic action of epinephrine in relation to its power of dilating the brochioles in asthmatic patients by the addition of phenol to the drug.

Death of Afranio Peixoto

Dr. Afranio Peixoto, professor emeritus, University of Rio de Janeiro, died at the age of 67. After graduating from the Medical School of Salvador, state of Bahia, he moved to Rio de Janeiro, where he was to begin a remarkable career as professor of hygiene. He published many scientific essays and several novels, which were all best sellers. He was a member of the National Academy of Medicine and also one of the forty members of the Brazilian Literary Academy. His death was a great loss to medicine and to Brazilian letters as well.

Medical Examinations and Licensure

COMING EXAMINATIONS AND MEETINGS

NATIONAL BOARD OF MEDICAL EXAMINERS EXAMINING BOARDS IN SPECIALTIES

Examinations of the National Board of Medical Examiners and the Examining Boards in Specialties were published in THE JOURNAL, May 10, page 209.

BOARDS OF MEDICAL EXAMINERS

ALABAMA: Montgomery, June 24-26. Sec., Dr. D. G. Gill, 519 Dexter Ave., Montgomery 4.

ARIZONA: *Examination.* Phoenix, July 1-2. Sec., Dr. J. H. Patterson, 826 Security Bldg., Phoenix.

ARKANSAS: * *Medical. Examination.* June 5-6. Sec., Medical Board of the Arkansas Medical Society, Dr. L. J. Kosminsky, Texarkana. *Eclectic.* Little Rock, June 5. Sec., Dr. C. H. Young, 1415 Main St., Little Rock.

CALIFORNIA: *Written.* San Francisco, July 7-10. *Oral.* San Francisco, May 10-11. *Oral Clinical Examination for Foreign Medical Graduates.* San Francisco, June 21. Sec., Dr. Frederick N. Scatena, 1020 N. St., Sacramento 14.

COLORADO: *Examination.* Denver, July 18. Sec., Dr. J. B. Davis, 831 Republic Bldg., Denver.

CONNECTICUT: *Examination.* Hartford, July 8-9. Sec., Dr. Creighton Barker, 258 Church St., New Haven. *Homeopathic.* Derby, July 8. Sec., Dr. Joseph H. Evans, 1488 Chapel St., New Haven.

DELAWARE: *Examination.* Dover, July 8-10. *Endorsement.* Dover, July 15. Sec., Medical Council of Delaware, Dr. J. S. McDaniel, 229 S. State St., Dover.

DISTRICT OF COLUMBIA: * *Reciprocity.* Washington, June 9. Sec., Commission on Licensure, Dr. George C. Ruhland, 6012 E. Municipal Bldg., Washington 1.

FLORIDA: * *Examination.* Jacksonville, June 24-25. Sec., Dr. Harold D. Van Schaick, 2736 S. W. Seventh Ave., Miami 36.

GEORGIA: Atlanta, Oct. 14-16. Sec., Mr. R. C. Coleman, 111 State Capitol, Atlanta 3.

HAWAII: *Examination.* Honolulu, July 8-11. Sec., Dr. S. E. Doolittle, 881 S. Hotel St., Honolulu 53.

IDAHO: Boise, July 14-16. Sec., Bureau of Occupational Licenses, Dr. S. M. Poindexter, Eastman Bldg., Boise.

ILLINOIS: *Examination.* Chicago, June 24-26. Sec., Mr. Philip M. Harman, Supt. of Registration, State House, Springfield.

INDIANA: *Examination.* Indianapolis, June. Exec. Sec., Board of Medical Registration and Examination, Miss Ruth V. Kirk, 627 K. of P. Bldg., Indianapolis.

KANSAS: *Endorsement.* Kansas City, June 26. Sec., Board of Medical Registration and Examination, Dr. J. F. Hassig, 905 N. Seventh St., Kansas City 10.

KENTUCKY: *Examination.* Louisville, Sept. 22-24. Sec., State Board of Health, Dr. P. E. Blackerby, 620 S. Third St., Louisville 2.

MAINE: Augusta, July 1-2. Sec., Board of Registration in Medicine, Dr. Adam P. Leighton, 192 State St., Portland.

MARYLAND: *Medical Examination.* Baltimore, June 17-20. Sec., Dr. E. H. Kloman, 1215 Cathedral St., Baltimore. *Homeopathic.* Baltimore, June 10-11. Sec., Dr. J. A. Evans, 612 W. 40th St., Baltimore.

MASSACHUSETTS: *Examination.* Boston, July 8-11. Sec., Board of Registration in Medicine, Dr. H. Q. Gallupe, 413 E State House, Boston.

MICHIGAN: * *Examination.* Detroit, June 9-11. Semi-Annual meeting, Lansing, June 24. Sec., Board of Registration in Medicine, Dr. J. E. McIntyre, 100 W. Allegan St., Lansing 8.

MINNESOTA: *Examination.* Minneapolis, June 17-19. Sec., Dr. J. F. DuBois, 230 Lowry Medical Arts Bldg., St. Paul 2.

MISSISSIPPI: Jackson, June 23-24. Asst. Sec., State Board of Health, Dr. R. N. Whitfield, Jackson 113.

MISSOURI: *Examination.* St. Louis, May 26-28 and June 9-11. Exec. Sec., Mr. John A. Hailey, Box 4, State Capitol Building, Jefferson City.

NEBRASKA: * *Examination.* Omaha, June. Dir., Bureau of Examining Boards, Mr. Oscar F. Humble, State Capitol Bldg., Lincoln.

NEW HAMPSHIRE: *Examination.* Concord, Sept. 11-12. Sec., Board of Registration in Medicine, Dr. John S. Wheeler, 107 State House, Concord.

NEW JERSEY: Trenton, June 17-18. Sec., Dr. E. S. Hallinger, 28 W. State St., Trenton.

NEW YORK: *Examination.* Albany, Buffalo, New York and Syracuse, June 23-26. Sec., Dr. Jacob L. Lochner Jr., State Education Bldg., Albany.

NORTH CAROLINA: *Endorsement.* Raleigh, June 24. *Examination.* Raleigh, June 23-26. Acting Sec., Mrs. L. McNeill, 226 Hillsboro St., Raleigh.

NORTH DAKOTA: Grand Forks, July 1-4. Sec., Dr. G. M. Williamson, 4½ S. Third St., Grand Forks.

OHIO: *Examination.* Columbus, June 17-20. Sec., Dr. H. M. Platter, 21 W. Broad St., Columbus.

OKLAHOMA: *Examination.* Oklahoma City, June 3-4. Sec., Dr. Frank Clinton Gallaher, 813 Braniff Bldg., Oklahoma City.

PENNSYLVANIA: Philadelphia and Pittsburgh, July. Acting Sec., Bureau of Professional Licensing, Department of Public Instruction, Mrs. M. G. Steiner, 351 Education Bldg., Harrisburg.

SOUTH CAROLINA: Columbia, June 23-25. Sec., Dr. N. B. Heyward, 1329 Blanding St., Columbia.

SOUTH DAKOTA: * Pierre, July 15-16. Sec., Medical Licensure, State Board of Health, Dr. Gilbert Cottam, Capitol Bldg., Pierre.

TENNESSEE: Memphis and Nashville, June 11-12. Sec., Dr. Harley W. Qualls, 1635 Exchange Bldg., 130 Madison Ave., Memphis 3.

TEXAS: Austin, June 5-7. Sec., Dr. T. J. Crowe, 918-20 Texas Bank Building, Dallas 2.

VIRGINIA: Richmond, June 18-21. Sec., Dr. K. D. Graves, 306 Medical Arts Bldg., 30½ Franklin Rd., Roanoke.

WEST VIRGINIA: *Examination.* Charleston, June 30, July 1-2. Commissioner, Public Health Council, Dr. Newman H. Dyer, State Capitol, Charleston 5.

WYOMING: *Examination.* Cheyenne, June 2. Sec., Dr. G. M. Anderson, Capitol Bldg., Cheyenne.

* Basic Science Certificate required.

BOARDS OF EXAMINERS IN THE BASIC SCIENCES

ARIZONA: June 17. Sec., Mr. Francis A. Roy, Science Hall, University of Arizona, Tucson.

COLORADO: Denver, June 4-5. Sec., Dr. Esther B. Starks, 1459 Ogden Street, Denver.

CONNECTICUT: June 14. Exec. Asst., State Board of Healing Arts, Mr. W. G. Reynolds, 250 Church St., New Haven 10.

IOWA: Des Moines, July 8. Sec., Dr. Ben H. Peterson, Coe College, Cedar Rapids.

MINNESOTA: Minneapolis, June 3-4. Sec., Dr. Raymond N. Bieter, 105 Millard Hall, University of Minnesota, Minneapolis 14.

OREGON: June 7. Final date for filing application is May 21. Sec., Mr. C. D. Byrne, University of Oregon, Eugene.

SOUTH DAKOTA: Vermillion, June 6-7. Sec., Dr. G. M. Evans, 310 E. 15th St., Yankton.

TENNESSEE: *Examination.* Nashville and Memphis, June 13-14. Sec., Dr. O. W. Hyman, 874 Union Ave., Memphis.

Medical Motion Pictures

NEW MOTION PICTURE ADDED TO A. M. A. FILM LIBRARY

A Stitch In Time. 16 mm., black and white, sound, 900 feet (one reel), showing time twenty-five minutes. Sponsored by the Sears-Roebuck Foundation and endorsed by the National Safety Council. Produced in 1944 by C. L. Venard, Peoria, Ill. Procurable on loan from Motion Picture Library, American Medical Association, 535 North Dearborn Street, Chicago 10.

Farming today is one of the most hazardous of all occupations. Many industries are compelled by law to provide safety devices for their employees and to provide care and compensation for any one who is injured. Generally the farmer is his own boss or employs only a few men. As a rule he does not carry compensation, hospital or accident insurance. He is, however, handling machinery that is just as powerful as many other industrial machines and handling the machinery over rough ground in contrast to many industries that can bolt the machine securely to a solid floor. The National Safety Council estimates that more than 1,500,000 rural people are injured annually. Safeguarding the health of rural people is of special importance not only to rural people themselves but also to the entire nation.

The motion picture "A Stitch in Time" is designed to make the American farm a safe place to work and live. It brings out vividly the peacefulness and beauty of the countryside and then awakens us to the many hazards that are lurking unseen in all this serenity. The picture stresses the importance of self protection through education and preventive methods. The country doctor whom the farmer summons to save his little girl from the venomous snake attack clearly shows the importance of a widespread safety program by every person. Farmers are not more careless than other people but from pioneer days they learned to be fearless and courageous and perhaps take many chances that could be easily avoided.

This film is highly recommended for showing before all rural groups as an educational project in extending better health to rural communities.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Charitable Hospitals: Right of Employees to Organize and Bargain Collectively.—The Laundry Workers, Dry Cleaners and Miscellaneous Workers of the Amalgamated Clothing Workers of America petitioned the labor relations commission for certification as the collective bargaining agency of certain nonprofessional employees of St. Luke's Hospital. The hospital filed a motion to dismiss on the ground that the commission had no jurisdiction to entertain the petition. Before the commission made a ruling on such motion, however, the hospital filed the present proceeding asking for a declaratory judgment that the commission had no jurisdiction to hear the petition for certification. In this action a preliminary injunction was issued restraining the commission from taking any further action in the certification proceedings, so the commission appealed to the Supreme Judicial Court of Massachusetts.

The hospital was incorporated in 1884 as a nonprofit, charitable corporation. It has more than 300 beds and maintains an outpatient department and various clinics. Its funds are obtained from fees, gifts, bequests and participation in a local community fund. It furnishes free services to patients who are unable to pay, and such service amounted in 1945 to 12 per cent of the total service rendered by the hospital. Treatment and care of recipients of city welfare are paid for by the city at a rate less than the regular charge. The federal government pays for services provided for federal patients. The union sought certification as the bargaining agent of 125 employees, including laundry workers, maids, porters, machinists, yard help, watchmen, storemen, waitresses, page girls, kitchen and cafeteria help and orderlies.

The only question of substantive law presented is whether or not the hospital comes within the sweep of the state labor relations act. The policy of that act, said the court, is the promotion of peace and the prevention of strikes in order that there may be no obstructions to the free flow of industry and trade. To come within the ambit of the authority of the commission, the selection of a bargaining representative must be connected with and related to industry and trade. A hospital like the plaintiff, whose doors are open to those needing medical and surgical treatment for which no charge is made to those unable to pay, which depends for its support and maintenance on fees, gifts and donations, which cares for recipients of public welfare at reduced rates and which is conducted in the interests of the general public and strictly as a nonprofit organization is a public charity. Such a hospital, said the court, is not conducting a business or commercial enterprise and is not engaged in industry and trade. Continuing, the court pointed out that the agreed facts showed that the sole activity of the plaintiff is the maintenance of its hospital and that the services of its nonprofessional employees, for whom the union seeks certification as their bargaining agency, are directed to that end.

It is urged by the commission, however, that a hospital comes within the definition of an "employer," because the word as defined in section 2 includes "any person acting in the interest of an employer, directly or indirectly, but shall not include the commonwealth or political subdivision thereof, or any labor organization," with certain exceptions. It is contended that, specific exceptions having been expressly mentioned, no others may be supplied by implication. This contention, said the court, rests on a familiar principle of statutory interpretation. But the entire chapter in which the definition appears must be construed as a whole, and the question is not whether a hospital is expressly exempted but whether a hospital comes within the sweep of the chapter in the light of its declared underlying and predominant aim and object. It is true, said the court, that the employees whom the union sought to represent were engaged in various kinds of manual labor, some of which were similar to those performed in hotels. It is also true, continued the court, that such services were essential to the maintenance of the hospital. Those rendering the services, however, can hardly be said to be engaged in industry or trade. The policy limits the scope of the act and clearly shows that a hospital which is organized and conducted as a public charitable institution is not covered by the act. Accordingly the order granting the preliminary injunction was affirmed and a final decree entered adjudging that the hospital and its nonprofessional employees engaged in duties necessary for the maintenance and operation of the hospital are not within the provisions of the state labor relations act.—*St. Luke's Hospital v. Labor Relations Commission, 70 N. E. (2d) 10 (Mass., 1946).*

Malpractice: Death Following Tonsillectomy—Application of Res Ipsa Loquitur.—The plaintiff sued for damages because of her daughter's death following a tonsillectomy, the death allegedly having been caused by the negligence of the defendant physician. From a directed verdict in favor of the defendant, the plaintiff appealed to the Supreme Court of Mississippi.

The defendant performed a tonsillectomy on the plaintiff's child. After the operation the child was returned to her hospital bed, at which time the defendant told the plaintiff to go out and get some lunch, "the baby is all right." The plaintiff returned about twenty minutes later and noticed that the child appeared abnormal. The defendant was immediately called. He felt her pulse and at once summoned other doctors and the nurses. Oxygen was administered without favorable results and the child died in a very short time. The only witness at the trial was the plaintiff. At the conclusion of her testimony the defendant physician moved the court "that there be a directed verdict in favor of Dr. Smith for the reason that there has been no proof offered of any lack of care and skill . . . all that has been introduced is the fact that he operated on the child, and the child died." The motion was sustained by the trial court in a brief statement that "our courts have held, in the *Berryhill* v. *Nichols* case, and in subsequent cases, that to establish liability for a wrongful death there must be a believable probability rather than a possibility; . . ." On appeal to the Supreme Court, the plainitff contended that she was entitled to the benefits of the doctrine of "res ipsa loquitur," saying "It is a matter of common knowledge that death does not ordinarily result from a tonsillectomy. Yet, Evelyn Sanders died shortly after a tonsillectomy was performed on her. Why she did so, neither we nor [appellees] know. We submit that her parents are entitled to an explanation. And that the court erred in excusing [appellees] from making such explanation."

In a prior Mississippi case the Supreme Court said "Res ipsa loquitur means that the facts of the occurrence warrant the inference of negligence; not that they compel such an inference, but that they furnish circumstantial evidence of negligence where direct evidence of it may be lacking." After discussing a number of cases from other jurisdictions in which the principle of res ipsa loquitur was involved, the Supreme Court said that it had previously laid down the rule that the doctrine of res ipsa loquitur should be cautiously applied. An analysis of the cases, continued the court, leads to the conclusion that the test is not that the result of the operation was unusual and unexpected, or even fatal, alone and by itself. The real question is whether or not in the process of the operation any extraordinary incident or unusual event occurred outside of the routine of the action of its performance and beyond the regular scope of customary professional activity in such operations, which, if unexplained, would itself reasonably speak to the average man as the negligent cause or causes of the untoward consequence. If there were such extraneous interventions, then the doctrine of res ipsa loquitur would be applicable to call on the defendant to explain the matter by evidence of exculpation if he could. The jury would then decide the issue of fact in the case. In the case at bar, however, the court concluded, we are of the opinion that the maxim has no proper application and that the trial court was correct in entering a directed verdict for the defendant. The judgment of the trial court was accordingly affirmed.—*Sanders v. Smith, 27 So. (2d) 889 (Miss., 1946).*

Current Medical Literature

AMERICAN

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Titles marked with an asterisk (*) are abstracted below.

Alabama State Medical Assn. Journal, Montgomery

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Observation on Malaria in Mediterranean Theater of Operations, United States Army, 1943-1945. J. B. McLester.—p. 221.
Malaria in Pacific. E. G. Givhan.—p. 224.
Tuberculosis Control Program for State of Alabama, with Special Emphasis on Case Finding. A. H. Russakoff.—p. 227.
Penicillin in Treatment of Syphilis. P. G. Reque.—p. 232.
Evaluation of Fenestration Operation for Deafness. E. R. Nodine.—p. 236.

Annals of Surgery, Philadelphia

125:129-256 (Feb.) 1947

Use of Shunt or By-Pass Operations in Treatment of Certain Circulatory Disorders, Including Portal Hypertension and Pulmonic Stenosis. A. Blalock.—p. 129.
Thoracic Surgery in Hospital Center. L. Miscall and A. W. Harrison.—p. 142.
War Experiences with Nonsuture Technic of Anastomosis in Primary Arterial Injuries. C. F. Stewart.—p. 157.
*Phenylpropanolamine Hydrochloride: Vasopressor Drug, for Maintaining Blood Pressure During Spinal Anesthesia. P. H. Lorhan and D. Mosser.—p. 171.
Effect of Local Reduction of Temperature on Scald Burns in Rat. H. Baxter and R. H. More.—p. 177.
*Streptomycin in Surgical Infections: I. Laboratory Studies. E. J. Pulaski and H. Sprinz, with technical assistance of C. E. Heist and Helen B. Ehrhorn.—p. 194.
*Sympathectomy in Trench Foot. H. B. Shumacker Jr. and D. I. Abramson.—p. 203.
Congenital Dislocation of Hip. M. B. Howorth.—p. 216.
Autogenous Diced Cartilage Transplants to Bone: Experimental Study. S. D. Gordon and R. F. Warren.—p. 237.
Experimental Carcinoma of Gallbladder: Supplementary Data. N. N. Petrov and N. A. Krotkina.—p. 241.

Phenylpropanolamine Hydrochloride for Maintaining Blood Pressure During Spinal Anesthesia.—Phenylpropanolamine hydrochloride was used in 263 cases after the administration of a spinal anesthetic. Its ability to maintain blood pressure during the performance of a variety of surgical procedures has been established. The drug is an effective vasopressor agent with a moderately prolonged action—forty-five minutes—and has no apparent harmful side effects. The optimal effective dose of phenylpropanolamine hydrochloride was found to be 50 mg. administered intramuscularly. This dose maintained the blood pressure at preoperative levels in 90 per cent of the cases studied. Phenylpropanolamine hydrochloride has a vasopressor effect which compares favorably with the action of epinephrine, ephedrine and neosynephrine and offers certain advantages over them; namely, a more prolonged action and less frequent excitation.

Streptomycin in Surgical Infections.—One thousand cultures of bacteria were tested for their susceptibility to streptomycin by a broth-serial-dilution method. Pulaski and Sprinz present data on results of studies on absorption, distribution and excretion of streptomycin in the body following parenteral administration of the drug. The results of susceptibility tests and of assays of blood serum concentrations of streptomycin have been correlated, and on this basis a division is made between clinically sensitive and clinically refractory bacteria.

Sympathectomy in Trench Foot.—Shumacker and Abramson say that of 700 cases of trench foot at the vascular center at the Mayo General Hospital sympathectomy was done in 49. Sixty-six lower extremities were sympathectomized. The second and third lumbar sympathetic ganglions with the intervening chain were excised through an anterior extraperitoneal approach. In many cases the operation was preceded by a procaine lumbar sympathetic block. The chief indications for operation are (1) extensive gangrene, (2) excessive sympathetic tonus and (3) the complaint of pain on weight bearing. Sympathectomy accelerated healing in cases of extensive gangrene associated with vasospasm. It was also of aid in treating the maceration of the skin and the complicating secondary infection which result in the event of prolonged hyperhidrosis. The procedure reduced the severity of the symptoms in cases in which cold sensitivity was present. It produced variable results in the treatment of pain on weight bearing but had some therapeutic effect on the sensory disturbances. Sympathectomy has a definite but limited use in certain selected cases of trench foot. It appears to have no applicability in the majority of cases.

Archives of Internal Medicine, Chicago

79:129-252 (Feb.) 1947

*Bearing of General Nutritional State on Atherosclerosis. S. L. Wilens.—p. 129.
Necrosis of Renal Papillae and Acute Pyelonephritis in Diabetes Mellitus. H. A. Edmondson, Helen Eastman Martin and N. Evans.—p. 148.
Eosinophilic Granuloma of Bone: Report of Case with Multiple Lesions of Bone and Pulmonary Infiltration. A. Weinstein, H. C. Francis and B. F. Sprofkin.—p. 176.
*Induced Malaria of Foreign Origin. W. W. Engstrom, H. H. Gordon, A. Marble and H. A. Brunsting.—p. 185.
Actinomycotic Endocarditis: Report of 2 Cases, with Review of Literature. E. S. Wedding.—p. 203.
Cardiac Manifestations of Toxic Action of Emetine Hydrochloride in Amebic Dysentery. S. Dack and R. E. Moloshok.—p. 228.
Penicillin in Treatment of Keratosis Blennorrhagica with Polyarthritis. A. W. Freireich, S. Schwartz and O. Steinbrocker.—p. 239.

Nutritional State and Atherosclerosis.—In a comparison of the incidence of various degrees of general atherosclerosis and of atherosclerosis of the coronary arteries at necropsy of 395 obese persons, 372 persons of average nutrition and 483 poorly nourished persons 35 years of age and older, Wilens found that advanced atherosclerosis is about twice as common in the obese as in the poorly nourished group. The group with average nutrition has less severe atherosclerosis than the obese group but more than the poorly nourished one. The relationship demonstrated between the state of nutrition at necropsy and the degree of atherosclerosis is independent of age, sex, hypertension, heart weight and diabetes. Obesity appears to be a more striking factor in the development of atherosclerosis in men than in women. This is particularly true of atherosclerosis of the coronary arteries. Although the analysis is based on the state of nutrition as observed at necropsy, evidence is presented to show that if the analysis had been based on the probable state of nutrition prior to the onset of the final illness the relationship between atherosclerosis and nutrition would be even more striking.

Induced Malaria.—Engstrom and his associates made attempts to transmit Plasmodium vivax malaria in 195 patients with neurosyphilis by mosquito bites or by inoculation of blood. The strains transmitted were of Pacific and Mediterranean origin. The attempts to transfer P. vivax malaria by mosquito bites or by inoculation of blood were highly successful in white patients, whether they gave a past history of malaria or not, and relatively unsuccessful in Negro patients. A spontaneous remission of fever was observed more than three times as frequently in those who gave a past history of malaria as in those who did not. The prepatent and incubation periods averaged about two weeks when mosquitoes, and five days when blood, was used in the transmission of the infection. As the disease progressed the concentration of parasites in the blood at first rapidly increased but after the eleventh day began to fall. Sixty-five per cent of the patients inoculated by mosquitoes infected with Pacific strains of P. vivax had relapses, while no patients relapsed who had been inoculated intravenously with blood containing the same strains. Quartan malaria was transmitted to 48 patients (45 Negro and 3 white) by inoculation of blood containing P. malariae. Quartan malaria differed from tertian (P. vivax)

malaria not only in the longer interval between paroxysms but also in the longer period of incubation, the slower response to quinacrine therapy and the tendency to cause serious renal complications.

Archives of Ophthalmology, Chicago

37:121-260 (Feb.) 1947

Surgical Methods of Treating Paralysis of Superior Oblique Muscle. W. E. Krewson.—p. 121.
Surgical Treatment of Primary Glaucoma. C. S. O'Brien.—p. 134.
Relapsing and Chronic Ocular Lesions Following Mustard Gas (Dichloroethyl Sulfide) Burns. R. O. Scholz and A. C. Woods.—p. 139.
A Squint Syndrome. K. C. Swan.—p. 149.
Dermatomyositis with Retinopathy: Report of Case. J. V. Lisman.—p. 155.
Pharmacologic Action of Some Ophthalmic Drugs. W. Modell.—p. 160.
Stability of Penicillin in Ophthalmic Solutions. E. E. Grossmann.—p. 167.
Marginal Myotomy: Analysis of 22 Cases. G. G. Gibson.—p. 175.
Capillary Sphincter in Human Retina. J. N. Evans.—p. 182.
*Removal of Deeply Embedded Foreign Bodies from Cornea. S. A. Fox.—p. 189.
New Modification of McReynolds Transplantation for Pterygium. J. Goldsmith.—p. 194.
*Arachnoiditis. D. Kravitz.—p. 199.
Exophthalmos and Associated Ocular Disturbances in Hyperthyroidism: I. Givner, M. Bruger and O. Lowenstein.—p. 211.
Cyclopia. S. Gartner.—p. 220.

Removal of Foreign Bodies from the Cornea.—Fox reports the results of observations on 6 deeply embedded corneal foreign bodies which required removal. The foreign bodies were all metallic. Three were found to be magnetic after removal. Even if the foreign body is magnetic, the magnet is useless in removal of these deeply embedded bodies from the cornea until they have been loosened from the surrounding stroma. In all 6 cases the cornea was healed within four days or less. Clean incision of the cornea, instead of "picking" at it, results in less mutilation of corneal stroma and consequently less corneal opacification. If the cornea should be penetrated, the flap is an efficient valve with which the anterior chamber can be sealed off instantly, and it heals in rapidly.

Arachnoiditis.—Kravitz points out that arachnoiditis is either adhesive or cystic in form. The cysts are collections of cerebrospinal fluid walled off by adhesions, and the fluid may at times be under great tension. The adhesive form is characterized by dense adhesions, which may bind the optic nerves and chiasm to any or all of the surrounding structures. The optic nerves and chiasm are usually involved in the opticochiasmic type of the disease. In this form of arachnoiditis sight is frequently jeopardized and the disks are rarely normal. There may be primary, secondary or a segmental type of atrophy of the optic nerve, or even extreme degrees of choked disk, or any combination or gradation of these signs. A central scotoma is common. Occasionally one sees typical bitemporal field defects, but more often they are bizarre. The most usual symptom in this form of arachnoiditis is the early, and usually rapid, loss of vision. The prognosis is good, especially as regards vision, if operation is resorted to early. If the condition has lasted too long, the loss of vision becomes irreparable. If conservative treatment fails, operative treatment is advisable. The author reports 9 cases and stresses that arachnoiditis is not as rare as is commonly thought. Opticochiasmic arachnoiditis presents a great threat to vision, but other forms of arachnoiditis can be as great a threat.

Illinois Medical Journal, Chicago

91:61-108 (Feb.) 1947

Positive Serologic Reaction Is Not a Diagnosis of Syphilis. J. R. Porter.—p. 71.
Refrigeration in Surgery of Extremities. W. J. Pickett.—p. 74.
Staphylococcus Pneumonia in Children: Roentgen Aspects. W. E. Anspach.—p. 75.
Marked Hyperproteinemia in Subacute Bacterial Endocarditis (and Simultaneous Hyperthyroidism and Subacute Bacterial Endocarditis). L. Cardon, D. Atlas and Regina Greenebaum.—p. 78.
Streptococcus Viridans Meningitis with Pneumonia. F. A. Kyser.—p. 81.
Reflections Based on Psychiatric Work in Army General Hospital in ETO. G. L. Perkins.—p. 83.
Diagnosis and Treatment of Blepharoptosis. S. J. Meyer.—p. 89.
Periodic Physical Examinations in Apparently Well Women. A. Webster.—p. 92.

Journal of Experimental Medicine, New York

85:141-216 (Feb.) 1947

Inactivation of Penicillins F, G, K and X by Human and Rabbit Serum. H. Eagle.—p. 141.
Varying Blood Levels Afforded by Penicillins F, G, K and X in Rabbits and Man. H. Eagle with technical assistance of Arlyne D. Musselman.—p. 163.
Therapeutic Activity of Penicillins F, G, K and X in Experimental Infections with Pneumococcus Type I and Streptococcus Pyogenes. H. Eagle with technical assistance of Arlyne D. Musselman.—p. 175.
Desoxycorticosterone Acetate: Potentiation of Its Activity by Sodium Chloride. A. I. Knowlton, Emily N. Loeb, H. C. Stoerk and Beatrice C. Seegal.—p. 187.
*Reactions of Monkeys to Experimental Mixed Influenza and Streptococcus Infections: Analysis of Relative Roles of Humoral and Cellular Immunity, with Description of Intercurrent Nephritic Syndrome. H. E. Wilson, S. Saslaw, C. A. Doan, O. C. Woolpert and J. L. Schwab.—p. 199.

Reactions of Monkeys to Mixed Influenza and Streptococcic Infections.—Wilson and his associates report studies on monkeys which were infected with influenza and streptococci either simultaneously or in varying sequence. They demonstrated the vital importance of the cellular defense forces in the resistance of the monkey to combined streptococcic and influenza virus infections. Some of the conditions prejudicial to the maintenance of an optimum cellular reserve in the infected animal were undernutrition, physical cold and the intratracheal route of infection. The potential threat exerted by latent foci of streptococci and the combined infection with virus have been demonstrated. Optimum nutrition, notably as concerns the vitamin B complex and folic acid, specifically plays an important part in the prevention of disastrous illness from these infectious agents. Simultaneous intranasal inoculation of influenza virus type A and Streptococcus hemolyticus group C in nutritionally normal Macaca mulatta failed to produce obvious signs of disease. In most of the animals a streptococcus induced leukocytosis developed followed by a delayed virus induced granulopenia. The development of signs of infection in previously healthy monkeys exposed to virus followed by streptococci confirms both clinical and laboratory experience of other observers that virus infection may predispose to secondary bacterial invasion and that the infection may become overwhelming.

Journal of Immunology, Baltimore

55:1-102 (Jan.) 1947

Study of Reliability of Complement Fixation as Method of Measuring Activities of Serums of High, Medium and Low Antibody Titer. Christine E. Rice.—p. 1.
Immunochemical Studies with Tagged Proteins. R. L. Libby and Caroline R. Madison.—p. 15.
Id.: II. Kinetics of Antibody Formation. D. J. Salley and R. L. Libby.—p. 27.
Quantitative Estimation of O Agglutinins in Typhoid Serums. J. Gurevitch and E. Ephrati.—p. 37.
Preparation and Properties of Purified Equine Encephalomyelitis Vaccine. R. Randall, J. W. Mills and L. L. Engel.—p. 41.
Observations on Specificity of Complement Fixation Test for Lymphogranuloma Venereum. Anna D. Dulaney and H. Packer, with technical assistance of Mary M. Smith, W. Hannah, R. Brett and B. Moore.—p. 53.
Virus of Ilhéus Encephalitis: Isolation, Serologic Specificity and Transmission. H. W. Laemmert Jr. and T. P. Hughes.—p. 61.
Purification and Characters of Newcastle Disease Virus (California Strain). R. Cunha, M. L. Weil, Dorothy Beard, A. R. Taylor, D. G. Sharp and J. W. Beard.—p. 69.
Simple Lyophilizing Apparatus for Laboratory Use. R. J. Heckly.—p. 91.
Preparation of Suspensions of Rickettsiae from Infected Yolk Sacs Without Use of Ether. C. C. Shepard and N. H. Topping.—p. 97.

Journal of Nervous and Mental Disease, New York

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Pattern of Enzyme Distribution in Brain and Mental Function. W. Ashby.—p. 107.
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Problems of Disease of Cerebellopontine Angle. F. Kennedy, I. S. Ross and I. Galin.—p. 149.
Group Therapy from Viewpoint of Patient. B. Simon, J. D. Holzberg, S. Aaron and C. H. Saxe.—p. 156.
Ambulatory Electroconvulsive Therapy. F. Feldman, Evelyn Gombert and S. E. Barrera.—p. 171.

Journal of Pediatrics, St. Louis

30:113-228 (Feb.) 1947

*Rheumatic Pneumonia: Report of 2 Cases. J. I. Mossberger.—p. 113.
Histoplasmosis in Infancy: Report of Case in Infant, with Brief Clinicopathologic Review. A. M. Iams and H. M. Keith.—p. 123.
*Salicylate Intoxication in Infant and Young Child: Report of 13 Cases. Jane A. Erganian, G. B. Forbes and Dorothy M. Case.—p. 129.
Tuberculous Dactylitis in Childhood: Prognosis. Janet B. Hardy and J. R. Hartmann.—p. 146.
*Acute Glomerulonephritis: Review of 90 Cases. F. G. Burke and S. Ross.—p. 157.
Agglutinative Reaction for Hemophilus Pertussis Following Whooping Cough and Following Immunization. P. F. DeGara and Shirley A. Mayer.—p. 171.
Intraventricular Block in Malnutrition and Vitamin B Deficiency: Report of 2 Cases in Children. K. Braun, I. Roth and S. Suesskind.—p. 177.
Streptomycin Treatment of Salmonella Enteritis in Infants. E. Seligmann, L. Barash and S. Q. Cohlan.—p. 182.
Developmental Pediatrics. A. Gesell.—p. 188.
Tetanus. N. Silverthorne.—p. 195.

Rheumatic Pneumonia.—Mossberger thinks that since acute rheumatic fever is predominantly a childhood disease, and because most of the heart disease in children is rheumatic, the possibility must be considered that the pneumonia which occasionally develops in a child with endocarditis is also rheumatic in origin. Jensen has pointed out that probably many of the "primary atypical pneumonias" that have formerly been observed in cases of rheumatic fever were in reality rheumatic or poststreptococcic pneumonitis. Two cases of "atypical" pneumonia developing in the course of rheumatic fever are presented by Mossberger. Together, these 2 cases of lung disorder in children with rheumatic heart disease show most of the features of an exudative lesion resulting from injury to the capillary endothelium. Pulmonary histopathology parallels that seen in experimental and sulfonamide anaphylactic pneumonitis. The clinical histories of the 2 patients are consistent with the concept of an allergic mechanism in the production of pulmonary disease and stress that an exudative reaction such as pneumonitis may be delayed for some time after symptomatic subsidence of the initial endocarditis. This thought must be borne in mind in all cases of sulfonamide-penicillin resistant pneumonia occurring in children with histories of rheumatic fever.

Salicylate Intoxication in Young Children.—Most of the 13 patients with salicylate intoxication reviewed by Erganian and her associates were infants who received aspirin (acetylsalicylic acid) as treatment for a "cold." Studies on these 13 patients included salicylate concentration of the blood plasma and spinal fluid, p_H of the blood serum, carbon dioxide content of the serum, prothrombin time and urine examination. Other laboratory studies included serum chloride, glucose and nonprotein nitrogen determinations. The most severe type of reaction occurring in this group is a disturbance of the acid base equilibrium. At the time of hospitalization, all patients showed a metabolic acidosis with a lowered p_H and carbon dioxide content of the serum. Salicylates given experimentally to older children whose usual caloric and liquid intake were maintained produced less regular, if any, signs of toxicity. Salicyl compounds, when given in dosages from 0.066 Gm. per kilogram in twenty-four hours in six divided doses (approximately ½ grain per pound), tend to accumulate in the body, as shown by determinations of plasma levels. In view of the dangers and possibility of fatality in infants, it is suggested that aspirin be given not at all or very cautiously.

Acute Glomerulonephritis.—Burke and Ross review the salient clinical feature of 90 consecutive cases of acute glomerulonephritis observed at the Children's Hospital during the past three years. Eighty-four of the 90 patients recovered, 3 died during the acute attack and 3 developed chronic glomerulonephritis. The three deaths were associated with or were the direct result of acute nephritic congestive heart failure. Acute glomerulonephritis has been the most common cause of congestive heart failure at Children's Hospital for the past three years and was present in 35 of the 62 patients with acute nephritis who were examined for evidence of this complication. The treatment consisted largely of absolute bed rest and the management of symptoms as they appeared. The author stresses the advisability of administering digitalis in all cases of acute nephritis complicated by congestive heart failure.

Journal of Urology, Baltimore

57:203-426 (Feb.) 1947. **Partial Index**

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Further Observations on Nephrostomy. G. R. Livermore.—p. 213.
*Squamous Cell Carcinoma of Renal Fossa Following Nephrectomy for Stone. B. B. Madison.—p. 218.
*Hypertension Due to Unilateral Renal Disease. A. H. Crosbie and J. Fischmann.—p. 220.
Amicrobic Pyuria. F. C. Hamm.—p. 226.
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Recurrent Nontraumatic Intraperitoneal Rupture of Urinary Bladder; Recovery. G. D. Oppenheimer and L. J. Druckerman.—p. 238.
Effects of Blockade of Autonomic Ganglia on Urinary Bladder in Man. R. M. Nesbit, J. Lapides, W. W. Valk and others.—p. 242.
Leiomyosarcoma of Urinary Bladder: Report of Case. M. Lev and W. E. Bell.—p. 251.
Incomplete Reduplication of Bladder with Congenital Solitary Kidney: Report of Case. E. Burns, H. Cummins and J. Hyman.—p. 257.
Patent Urachus Associated with Urinary Tuberculosis. J. C. McClelland and K. F. Davis.—p. 270.
Spinal Cord Injuries: Urethrographic Study of Bladder Neck. G. C. Prather and B. Petroff.—p. 274.
Primary Tuberculosis of Prostate: Case Report. N. P. Rathbun.—p. 285.
*Hemorrhage Following Suprapubic Prostatectomy. S. F. Wilhelm and B. Levine.—p. 291.
Present Picture in Chemotherapy in Prostatic Carcinoma. W. P. Herbst.—p. 296.
Transurethral Resection and the Paraplegic. H. C. Bumpus Jr.—p. 300.
Congenital Cyst of Prostate Communicating with Right Vas and Rudimentary Right Ureter: Case Report. J. E. Dees.—p. 304.
Orchiopexy: New Modification of Bevan Technic. V. Vermooten.—p. 310.

Squamous Cell Carcinoma of Renal Fossa.—A man aged 38 had hematuria for fifteen years until January 1945. At that time the left kidney was removed for calculous disease. A large stone was found in the renal pelvis, but there was no microscopic study done on the kidney. In July 1945 the patient injured his left side and began having pain in that area. He became depressed and was transfered to a mental hospital for "shock treatments." He continued to complain of pain. Tentative diagnoses were made of retroperitoneal hematoma, retroperitoneal abscess and retroperitoneal sarcoma. Sections of tissue removed at operation led to the diagnosis of squamous cell carcinoma of the kidney. Madison says that Kretschmer pointed out in 1917 the influence of chronic infection and calculi on squamous cell carcinoma of the renal pelvis. The mental attitude of this patient was due to the toxic state, for even in the short period following drainage his attitude improved considerably.

Hypertension Due to Unilateral Renal Disease.—A woman aged 48 was taken sick suddenly with symptoms and signs of severe hypertension. She had impairment of vision in both eyes. Urologic examination revealed a very small right kidney lacking any degree of function. Nephrectomy resulted in a complete cure, including return of vision and decrease of blood pressure to normal. The patient's condition continued normal until ten months after operation, when very stormy symptoms and signs of acute cardiorenal failure developed. Death occurred eighteen days later of uremia. Crosbie and Fischmann believe that this case is worthy of being reported as another disappointing trial of surgical treatment for hypertension caused by renal disease.

Hemorrhage Following Suprapubic Prostatectomy.—According to Wilhelm and Levine, suprapubic prostatectomy is still widely practiced for the relief of the larger benign hypertrophies. In 400 consecutive suprapubic prostatectomies for nonmalignant hypertrophy carried out at the Beth Israel Hospital there were 20 postoperative hemorrhages severe enough to require surgical intervention (5 per cent). When packing with gauze strips was done the incidence was 3.5 per cent, as compared with 13.1 per cent in the patients in whom a Foley catheter was used. Patients with a Foley catheter bled most frequently immediately after operation, whereas hemorrhage occurred most often in the early secondary period when gauze packing was used within twenty-four hours after removal of the packing. Delayed secondary bleeding occurred in 5 cases on from the sixth to the seventeenth postoperative day and was caused by straining at stool, coughing, alkaline cystitis and residual prostatic tissue. The mortality rate of the patients suffering from hemorrhage

was 15 per cent, as compared to the general rate of 2.75 per cent. None of these patients died of exsanguination. Postoperative hemorrhage and infection were the chief complications contributing to the mortality rate.

Medical Annals of District of Columbia, Washington

16:57-118 (Feb.) 1947

Recent Advances in Pediatrics. S. Ross and J. S. Wall.—p. 57.
Future of Venereal Disease Control. E. A. Gillis.—p. 76.
Psychosomatic Approach to Peptic Ulcer. E. Weiss.—p. 81.
*Benadryl for Ivy Poisoning: Preliminary Report on Its Use in 14 Cases. L. S. Blumenthal and M. H. Rosenberg.—p. 86.

Benadryl for Ivy Poisoning.—Blumenthal and Rosenberg employed benadryl in treating 14 patients with ivy dermatitis. Most of the patients received local therapy for several days before the institution of benadryl treatment. Four of the patients continued to use the local medication after onset of benadryl treatment. Twelve of the 14 patients experienced great relief from the associated pruritus from four to eight hours after each dose. These patients could be maintained symptom free on 50 mg. doses of benadryl orally every four to six hours. Two patients received moderate relief. The lesions stopped spreading soon after the beginning of treatment in 3 patients and entirely cleared within seventy-two hours. The treatment did not alter the usual course of the rash in the other 11 patients even though the pruritus was controlled. The action of benadryl in these cases lends support to the theory that a histamine-like substance is liberated at the site of skin irritations.

Military Surgeon, Washington, D. C.

100:105-204 (Feb.) 1947

Surgeon's Role in War and Peace. R. T. McIntire.—p. 105.
Future Role of Psychiatry in Army. W. C. Menninger.—p. 108.
Current Problems in Naval Psychiatry. G. N. Raines.—p. 113.
Neuropsychiatric Casualties and Program of Veterans Administration. P. Bailey.—p. 119.
Research in Aero Medicine. M. C. Grow.—p. 123.
Protection of Human Body from Impact Forces of Fatal Magnitude. H. R. Bierman.—p. 125.
Naples Post Office Explosion. E. E. Hume.—p. 142.
Rehabilitation of the Blinded Soldier. J. N. Greear Jr.—p. 150.
Study of Acute Otitis Externa, with Special Reference to Secondary Myringitis and Otitis Media. K. M. Simonton.—p. 156.
"A Snake Bit Me!" L. M. Thompson.—p. 164.
Nursing in Air Evacuation. Emily G. Purvis.—p. 165.
Statistical Follow-Up of Effectiveness of Treatment of Combat Induced Psychiatric Casualties: II. Evacuations to Base. A. O. Ludwig and S. W. Ranson.—p. 169.

New York State Journal of Medicine, New York

47:209-320 (Feb. 1) 1947

Operative Treatment of Club Feet. J. C. McCauley Jr.—p. 255.
Public Health Aspects of Rheumatic Fever. A. D. Kaiser.—p. 259.
Plan for Statewide Distribution of Blood and Blood Derivatives. I. J. Brightman.—p. 264.
Premature Closure of Sutures of Cranial Vault: Plea for Early Recognition and Early Operation. L. A. Mount.—p. 270.
Keystones in Psychologic Thinking About Young Children. Nina Ridenour.—p. 277.
Program for Control of Tropical and Parasitic Diseases in New York City. E. L. Stebbens.—p. 282.

47:321-432 (Feb. 15) 1947

Radiologist in Navy. E. F. Merrill.—p. 368.
Acute Perforation of Peptic Ulcer, Early and Late Results. H. A. Kingsbury and J. A. Schilling.—p. 372.
Cancer of Prostate: General Considerations. R. M. Nesbit.—p. 376.
Interpretation of Phosphatase Findings in Carcinoma of Prostate. Helen Quincy Woodard.—p. 379.
Protein Nutrition in Surgery. R. Elman.—p. 382.

North Carolina Medical Journal, Winston-Salem

8:63-114 (Feb.) 1947

Treatment of Acute Nasal and Sinus Infection. O. E. van Alyea.—p. 63.
Treatment of Peptic Ulcer, with Special Reference to Acute Massive Hemorrhage. D. Hart and W. W. Shingleton.—p. 67.
Neuropsychiatric Aspects of Mental Deficiency: Clinicopathologic Study Based on 200 Autopsies. C. E. Benda.—p. 72.
Report of Patient Tolerating Crystalline Penicillin Without Reaction After Repeated Cutaneous Reactions to Crude Penicillin. S. W. Barefoot and S. Olansky.—p. 82.
Use of Rectal Pentothal Sodium in Obstetrics. E. W. Furgurson.—p. 84.
Demerol-Scopolamine Analgesia in Labor. J. C. Taylor.—p. 86.
"Small Unrecognized Strokes." E. S. Marks.—p. 88.
Intestinal Obstruction. C. A. Woodard.—p. 90.

Physiological Reviews, Baltimore

27:1-166 (Jan.) 1947

Regulation of Respiratory Movements by Peripheral Chemoreceptors. A. Pi-Suñer.—p. 1.
Action of Insulin. J. P. Bouckaert and C. de Duve.—p. 39.
Optimal Growth of Rat. M. S. Dunn, E. A. Murphy and L. B. Rockland.—p. 72.
Development of Graafian Follicle and Ovulation. F. L. Hisaw.—p. 95.
Renal Origin of Hypertension. H. Goldblatt.—p. 120.

Public Health Reports, Washington, D. C.

62:185-224 (Feb. 7) 1947

Standardization of Tuberculin. J. Holm and P. Lind.—p. 188.
Inherent Efficiency of X-Ray Methods Used in Detection of Tuberculosis. R. H. Morgan, H. E. Hilleboe and I. Lewis.—p. 201.

62:225-260 (Feb. 14) 1947

Progress Toward World Health Organization. From the Office of International Health Relations, United States Public Health Service.—p. 225.

62:261-292 (Feb. 21) 1947

*Restaurant Sanitation Program of United States Public Health Service. A. W. Fuchs.—p. 261.
Sickness Absenteeism Among Industrial Workers, Second and Third Quarters of 1946. W. M. Gafafer.—p. 272.

Restaurant Sanitation.—Fuchs discusses the importance of restaurant sanitation, pointing out that the Public Health Service acts solely in an advisory and stimulative capacity. It leaves enforcement to state and local health authorities. In a previous report the author outlined the development of the ordinance and code regulating eating and drinking establishments recommended by the United States Public Health Service. The current edition of the ordinance and code was printed in 1943 as Public Health Bulletin number 280. It is the culmination of nine years' effort, representing five different drafts. It is subject to change as improvements are developed. For the past three years the Public Health Service has devoted major attention to the portion of its restaurant sanitation program concerned with the education of food handlers. Sanitarians interested in organizing food handler schools in their communities may apply to their state health department and to the district office of the Public Health Service for assistance.

Southern Surgeon, Atlanta, Ga.

13:61-166 (Feb.) 1947. **Partial Index**

*Malignant Melanoma in Negro, with Report of 6 Cases. A. E. Imler and J. W. Underwood.—p. 61.
Uterine Bleeding: Puberty, Maturity, Post Climacteric. G. F. Douglas.—p. 72.
Primary Neoplasms of Trachea. G. E. Fisher.—p. 78.
Carcinoma of Prostate Gland. B. Barelare.—p. 85.
Problem for Anesthesiologist in Dealing with Malnourished Patient. Alice McNeal.—p. 99.
Fundamentals in Surgical Preparation of Thyrotoxic Patients: Use of Thiouracil. R. F. Guthrie.—p. 111.
Parenteral Fluids. H. Linder.—p. 121.
Lipoma of Colon: Treated by Primary Resection, with End to End Anastomosis. J. M. Mason III and J. Linn.—p. 128.
*Repair of Inguinal Hernia with Whole Skin Grafts. R. G. Goodall and R. F. Guthrie.—p. 135.
Intracranial Aneurysms: Considerations in Surgical Management. J. G. Galbraith.—p. 139.
Carotid Body Tumor. R. H. Smoot.—p. 159.

Malignant Melanoma in Negro.—A total of 73 cases of malignant melanoma in the Negro have been recorded, and these with the 6 cases presented by the authors make a total of 79 cases. One of the 6 reported cases is the second instance of a primary lesion developing in the nose, 1 is the third reported case of a malignant melanoma occurring in the mouth and another is the first instance of a primary lesion in the rectum. In 2 other cases the primary sites were the plantar surface of the great toe and the skin of the back. In 1 case it was impossible to determine the site of the primary lesion.

Whole Skin Grafts for Inguinal Hernia.—Goodall and Guthrie describe the successful repair of 6 inguinal hernias by the use of whole thickness skin grafts. The grafts were excised from the abdominal wall over the hernia site and implanted over the floor of the inguinal canal. The types of inguinal hernias repaired included 3 indirect inguinal hernias, 1 direct inguinal hernia, 1 sliding hernia of an indirect type and 1 recurrent saddle bag type hernia following a previous modified Bassini repair three and one-half years previously.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Journal of Ophthalmology, London

31:65-128 (Feb.) 1947

Production of Filtering Cicatrix in Glaucoma. R. Cruise.—p. 65.
Flap Sclerotomy in Treatment of Glaucoma. W. M. de C. Boxill.—p. 72.
Ophthalmoneurologic Symptoms in Connection with Malignant Nasopharyngeal Tumors. E. Godtfredsen.—p. 78.
Some Researches on Respiration of Cornea in Albino Rats. A. Bakker.—p. 100.
Contributions to Total Blepharoplasty. Ida Czukrasz.—p. 108.

British Journal of Surgery, Bristol

34:109-224 (Oct.) 1946

Endometriosis: Surgical Problem. D. Macleod.—p. 109.
Some Recent Advances in Pancreatic and Biliary Tract Surgery, Including Some Case Reports. T. M. J. d'Offay.—p. 116.
Excision and Repair of Deep Thermal Necrosis. O. T. Mansfield.—p. 128.
Reconstructive Surgery of Hand, with Special Reference to Digital Transplantation. A. R. Murray.—p. 131.
Myelography in Lumbar Intervertebral Disk Lesions: Correlation with Operative Findings. A. C. Begg, M. A. Falconer and M. McGeorge.—p. 141.
*Concept of Paralytic Ileus: Clinical Study. J. Devine.—p. 158.
Reconstruction of Biceps Brachii by Pectoral Muscle Transplantation. J. M. P. Clark.—p. 180.
Triplicate Ureter. I. Smith.—p. 182.
Surgical Anatomy of Parotid Gland. F. R. Hurford.—p. 186.
Simple Papilloma of Ureter. H. E. Harding, J. L. A. Grout and H. B. Yates.—p. 187.
Cystoscopy in Diagnosis and Treatment of Bilharzia Hematobium Infection. W. H. Kirkaldy-Willis.—p. 189.
Thyrotoxicosis as Surgical Problem. J. D. Robertson.—p. 194.

Paralytic Ileus.—Devine presents the results of a clinical study of a number of cases of paralytic ileus, of 43 cases in which intestinal intubation with the Miller-Abbott tube was performed, of a number of observations on patients with ileostomies and jejunostomies and of x-ray observations. True or idiopathic postoperative paralytic ileus is rare. It is a dangerous diagnosis to make, for it often prevents recognition of the real cause till it is too late for appropriate treatment. It was found that heat or turpentine stupes on the abdomen had no effect on bowel movements. Barbiturates decreased peristalsis and tone. Penicillin and sulfonamides did not materially affect peristaltic movements. Overdistention of the stomach caused loss of tone and decreased movement of the small bowel. Stimulation of the large intestine by enemas also stimulated the small intestine, even when this was completely isolated from the colon. By far the most frequent cause of a postoperative ileus is a postoperative intra-abdominal infection. From a study of Miller-Abbott recordings and abdominal sounds with regard to the return of intestinal movements after operation, and the return of these movements during recovery from paralytic ileus, the author deduces that there are three phases of ileus: stage 1, in which the movements are active, coordinated, responsive to stimulation and effective; stage 2, when they become irregular, incoordinated and are ineffective, and stage 3, fully developed paralytic ileus, when the intestinal movements disappear and completely fail. Stimulation in the second stage will often precipitate a paralytic ileus.

Lancet, London

1:165-200 (Feb. 1) 1947

Medical Aspects of Marriage Guidance. E. F. Griffith.—p. 165.
Fenestration Operation for Otosclerosis: Interim Report of 136 Cases. E. R. G. Passe.—p. 171.
*Liver Extract, Folic Acid and Thymine in Pernicious Anemia and Subacute Combined Degeneration. T. D. Spies and R. E. Stone.—p. 174.
Adrenal Apoplexy Associated with Hypertension. R. L. MacMillan.—p. 177.
Placental Hormones After Death of Fetus with Viable Placenta. B. Zondek.—p. 178.

Liver Extract, Folic Acid and Thymine in Anemia.—Spies and Stone gave folic acid to 9 patients with subacute combined degeneration and synthetic thymine to 4 patients with pernicious anemia. The effect of refined liver extract is also illustrated on the basis of a case report. The authors conclude that synthetic folic acid (Lactobacillus casei factor) and synthetic thymine (5-methyl uracil) will neither prevent the development of subacute combined degeneration in addisonian pernicious anemia nor relieve it once it has developed. Frequent parenteral injections of a potent liver extract are useful in the prevention of subacute combined degeneration and beneficial in relieving it once it has developed.

Schweizerische medizinische Wochenschrift, Basel

77:133-156 (Jan. 25) 1947

*Efficacy of Sulfonamides in Prophylaxis and Treatment of Severe Acute Inflammation of Middle Ear, of Mastoiditis and of Intracranial Complications. E. Lüscher and H. Iselin.—p. 133.
Placental Circulation in Enzygotic Twins. R. Wenner.—p. 140.
Medical Experiences in a Camp of Repatriated Swiss Citizens. W. Knoll and H. Ruckstuhl.—p. 141.
Aspect and Early Course of Tuberculosis in Patients from Concentration Camps. A. Zuppinger and A. Labhart.—p. 144.
Tonsillectomy in Tuberculous Children. E. Martens.—p. 146.

Sulfonamides in Acute Inflammation of the Middle Ear.—According to Lüscher and Iselin 606 patients with acute inflammation of the middle ear and its complications were admitted to the ear, nose and throat clinic of the University of Basle during the period of 1937 to 1940, when systematic sulfonamide treatment was not yet instituted. Five hundred and five patients with acute inflammation of the middle ear, acute recurrence mastoiditis and otogenous intracranial complications were admitted during the period of 1941 to 1944, when systematic sulfonamide treatment was practiced. The frequency of surgical intervention in the clinic decreased by 32 per cent during the second period as compared with the first; in the majority of the cases prevention of mastoiditis accounted for this decrease. There was a decrease in intracranial complications of the acute ostitis from 10.5 per cent during the first period to 4.2 per cent during the second period, but this applies almost exclusively to epidural abscess. There was a decrease of only 3.5 per cent to 3.3 per cent in the severe complications, including leptomeningitis. Mastoiditis proved chemoresistant in almost all the cases. Chemotherapy appears to be contraindicated in the presence of symptoms of mastoiditis. Mortality of acute otitis media has been reduced from 2.1 per cent to 0.79 per cent, and that of chronic suppurative otitis media from 2.6 per cent to 1.5 per cent. The total mortality of otitis media has been reduced from 2.2 per cent to 0.9 per cent. Systematic treatment with sulfonamides in home practice is suggested for all grave cases of acute inflammation of the middle ear.

Nordisk Medicin, Gothenburg

32:2675-2740 (Nov. 22) 1946. **Partial Index**

Penicillin in Venereology. S. Hellerström and G. Hagerman.—p. 2675.
Penicillin in Dermatology. G. Hagerman.—p. 2679.
Phenedrin as Stimulant for Sucking Ability in Weak Infants. O. Elgenmark.—p. 2681.
Ray Dosage for Patients in Roentgen Fluoroscopy and Photography. C. Wegelius.—p. 2684.

Hygiea

Case of Deciduosis Appendicis. N. B. Nordlander.—p. 2697.

Svenska Läkaresällskapets Förhandlingar

*Problem of Generator Gas Intoxication: I. Theoretical Points of View. S. Forssman.—p. 2717.
Problem of Generator Gas Intoxication: II. Experimental Investigations on Some Carbon Monoxide Problems. B. Gullberg and A. Svensson.—p. 2722.
Problem of Generator Gas Intoxication: III. Differential Diagnostic Points of View Regarding Acute and Chronic Carbon Monoxide (Generator Gas) Intoxication. G. Wohlfahrt, B. Gullberg and A. Svensson.—p. 2726.

Generator Gas Intoxication.—Forssman says that generator gas contains from 20 to 30 per cent of carbon monoxide, which is the toxically active constituent in generator gas. The generator gas problem is thus from the medical and hygienic points of view identical with the carbon monoxide gas problem. Chronic intoxication, the existence of which is questioned by some, may be mainly a sequel of repeated slight acute intoxication. Experiments in animals seem to confirm this theory. The sensitivity to carbon monoxide is variable in normal persons. It may be changed either to hypersensitivity or to tolerance by exposure to the gas.

Book Notices

Crippled Children in American Education, 1939-1942. By Romaine Prior Mackie, Ph.D. Teachers College, Columbia University Contributions to Education, No. 913. Cloth. Price, $2.10. Pp. 144. Bureau of Publications, Teachers College, Columbia University, 525 W. 120th St., New York 27, 1945.

This volume collects facts and figures which of themselves can be of little value to one interested in the education of the handicapped. The figures cover a small area of the country. About 25,784 out of a possible "more than 100,000" (p. 3) children are being educated according to figures found in the introduction; this survey covers only 16,696 children of a few schools, mostly in New York, New Jersey, Maryland, Michigan and Ohio. Little mention is made of Chicago, where education of the crippled child occupies an important place in the special school system. Early diagnosis and emergency treatment of poliomyelitis, once the disease which led all others in crippling effects, today rates about third on the list, both spastic paralysis and cardiac cases ranking first and second. The survey demonstrates the great differences of opinion among educators of the East as to where and how the handicapped shall be educated. This difference will always exist as long as each city or state selects its own plan of education rather than following the same plan as for physically fit children. The high school situation and the advantages offered by state rehabilitation funds for college or advanced educational work seem to be neglected, though in Chicago a definite setup for this educational phase has been in vogue for many years. Chapter IV gives to the layman a short concise description of each of the so-called crippling causes. Table IV of this chapter presents a picture which one could not visualize without the statement of facts contained therein. The table on distribution according to race cannot be considered too seriously, since the Southern states have most Negroes, and specialization in the care of handicapped in those regions is neglected. Statements to the effect that "most crippled children have mediocre intelligence" are decidedly debatable, and statistics are not supplied to satisfy this broad view.

Developmental Anatomy: A Textbook and Laboratory Manual of Embryology. By Leslie Brainerd Arey, Ph.D., Sc.D., LL.D., Robert Laughlin Rea Professor of Anatomy, Northwestern University, Chicago. Fifth edition. Cloth. Price, $7. Pp. 616, with 590 illustrations. W. B. Saunders Company, W. Washington Sq., Philadelphia 5; 7 Grape St., Shaftesbury, London, W. C. 2, 1946.

This well known and much used textbook, while retaining its former fundamental structure, appears in a much improved form. The main divisions general embryology, special development and a laboratory manual of embryology have all been modified to some extent, and attractive new illustrations added, but it is the first part that has been the more widely modified with much rewriting, addition of materials and new illustrations. Noteworthy improvements include chapters on reproductive cycles and their hormonal control, embodying discussions of estrous cycles, menstrual cycles and their relations to one another as well as to other cyclic phenomena in the uterus, vagina and mammary glands. The hormonal control of these phenomena involves pituitary, ovarian and placental hormones as well as some brief discussion of testis hormones. Although of necessity somewhat brief, they include basic essentials and permit the student to glimpse these important aspects bearing on the process and biology of reproduction. The chapter on experimental embryology introduces the approach to the analysis of development by experiment and points out some of the methods of attack. Problems associated with the initiation of development, cleavage and gastrulation, early localization, potency, embryonic determination and induction present some of the dynamic aspects of development to enliven the more static phases of descriptive development. The treatment of gastrulation has conspicuously included more modern concepts, especially in the bird (although one outdated illustration is inadvertently retained in part 3). The inclusion of recent knowledge on early human development, placentation and a unification on embryonic membranes is commendable. Improvements are also noted on treatment of growth and of histogenesis. The new edition will be heartily welcomed

Penicillin: Its Properties, Uses and Preparations. Published by Direction of the Council of The Pharmaceutical Society of Great Britain. Cloth. Price, 10s. 6d. Pp. 199, with illustrations. Pharmaceutical Press, 17 Bloomsbury Square, London, W. C. 1, 1946.

This compact volume is the most recent of several monographs on penicillin. Its purpose is to present to pharmacists and general practitioners the methods of preparing and using penicillin. In the usual fashion there is an introductory summary of the history of this remarkable antibiotic, followed by chapters on the methods of manufacturing and the chemistry and properties of penicillin. Methods of assaying penicillin are detailed, and the pharmacology is described. These informative phases embrace over one third of the contents. Thirty-three pages are devoted to the clinical use of penicillin. Then forty-nine pages are given to a description of pharmaceutic preparations. The volume concludes with legal considerations relative to penicillin regulations in Great Britain and patent rights. Obviously detailed and pertinent information covering the many phases of infections is lacking for the general practitioner. Sir Alexander Fleming's monograph is more practical and valuable for the doctor. The volume has an excellent index and is documented with 331 key references to the overwhelming literature on penicillin.

An Atlas of the Commoner Skin Diseases. By Henry C. G. Semon, M.A., D.M., F.R.C.P., Physician for Diseases of the Skin, Royal Northern Hospital, London. Third edition. Cloth. Price, $12. Pp. 343, with 139 plates reproduced by direct colour photography from the living subject under the direction of Arnold Moritz, B.A., M.B., B.C. William Wood & Co., Mount Royal and Guilford Aves., Baltimore 2, 1946.

The author prefaces this book with the statement that it is not meant to take the place of the standard textbook but "as an atlas it is designed to illustrate and its chief function is to assist the visual memory." The book represents an admirable and ambitious project, and many of the illustrations are excellent pictures of the lesions as they occur on patients. Unfortunately, many more are only fair, and in several instances the illustrations are useless and ineffective because in the process of reproduction either overexposure or underexposure prevented accuracy. The value of the book might have been enhanced too had greater care been used in the selection of the material to be illustrated. The brief clinical descriptions that accompany the illustrations are excellent and are made more interesting in that they are in the form of condensed case reports with consideration given to differential diagnosis and treatment. The layout is also excellent, with the text arranged in accessible position to each plate in order to afford help in diagnosis and as an aid to memory. The book should be useful to the practitioner, but it will be of little help to the medical student because, despite the claim that "the color values are superior to any as yet produced by other processes," too many of the illustrations fail to serve their purpose as models for diagnosis and visual study.

Phases in the Drinking History of Alcoholics: Analysis of a Survey Conducted by the Grapevine, Official Organ of Alcoholics Anonymous. By E. M. Jellinek, Sc.D., Director, Section of Studies on Alcohol, Yale University. Memoirs of the Section of Studies on Alcohol, Laboratory of Applied Physiology, Yale University, No. 5. [Distributed by Quarterly Journal of Studies on Alcohol.] Paper. Price, $1. Pp. 88, with 4 illustrations. Hillhouse Press, 432 Temple St., New Haven, Connecticut, 1946.

This attempts through a questionnaire approach to survey within the admittedly limited scope of having been able to use only 98 completed questionnaires out of 1,600 circulated copies to members of lay alcoholic groups phases in the drinking history of alcoholic addicts with the resulting "main implications" contained in "most significant" and other "suggestions," which are presented as differing from, and do definitely differ from, present day medical psychologic thinking.

Water Supplies, Hepatitis, Associated Diseases and Fungi Infested Water in Assam. By Arnold John Teal, M.B., B.S., D.P.H., Medical and Sanitary Officer, The Mariani Medical Association, Assam. Paper. Price, Rs. 2/8/—. Pp. 18. Doss & Co., Jorhat, Assam, 1945.

This is a conglomerate group of data, most of which do not lend themselves to scientific evaluation. Many of the recorded observations are of considerable interest but many must necessarily be considered as purely speculative and the conclusions drawn from them as empirical.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

SUNBURN AND INTERMITTENT CLAUDICATION—BUERGER'S EXERCISES

To the Editor:—Is there any reason why an extremely severe sunburn of the lower part of the legs would cause intermittent claudication to develop? Please outline the most satisfactory treatment for intermittent claudication. Also kindly outline Buerger's exercises for this condition.

H. O. Pope, M.D., Niantic, Ill.

ANSWER.—To establish any connection between a severe sunburn and the development of intermittent claudication one would have to know the patient's general cardiovascular status, the time interval between the exposure and the development of symptoms and the extent of hemoconcentration as a result of the sunburn, as shown by an elevated red cell count or hemoglobin. Thermal burns may produce venous thrombosis and infrequently arterial thrombosis; this occurs in patients who show severe hemoconcentration. This factor, together with the action of broken down tissue products, does increase the clotting tendency. It is not likely, however, that a normal vascular tree would respond with occlusion to a sunburn and a vascular lesion; possibly a latent form must have been present before the burn.

Intermittent claudication is simply a symptom of vascular insufficiency on effort, and its treatment varies according to the cause of the vascular disease. When due to Buerger's disease, the active process must be brought to a quiescent stage before collateral circulation can be stimulated. If due to an embolus, the source of the blood clot must be looked for, which is usually in the heart. In peripheral vascular sclerosis, factors such as diabetes, hypertension and lipemia may be controlled to a certain extent. After the nature of the underlying disease is understood, treatment may be directed toward increasing blood flow to the affected extremity. This may be done with drug therapy, although none of the drugs used at present have any but temporary effect. Heat can be used, never to the affected limb, but to the root of the limb or the trunk in the form of heat cradles, electric pads or short wave diathermy. Sympathectomy in the properly selected case may increase walking ability and is a protective measure against gangrene.

Buerger's exercises, as modified by Allen, are carried out as follows: The patient lies on his back and elevates his legs to an angle of 30 to 45 degrees, resting it on a support until his feet blanch; this may take from one to three minutes. In the second position the patient sits with his legs hanging over the edge of the bed, and the feet and toes are put through a series of motions; this is continued until maximal rubor occurs. This hyperemia may take a few minutes to develop. In the third position the patient rests horizontally wrapped in a woolen blanket for five minutes. These cycles are repeated for a period of an hour and may be done several times daily. It is doubtful that such exercises are of much value; they act by an alternate filling and emptying of the venocapillary bed, which can be accomplished more effectively with much less effort and for longer periods of time by an automatically operated rhythmic constrictor. Both Buerger's exercises and the alternate hot and cold baths are being widely used without impressive evidence of their usefulness.

ROUTINE ANTEPARTUM Rh TESTS

To the Editor:—What are the advantages and disadvantages of Rh factor determinations in expectant parents? Should this be as routine as the serologic test for syphilis?

Herman Goodman, M.D., New York.

ANSWER.—Antepartum tests for the Rh factor may disclose the possibility of fetal erythroblastosis in the baby to be born by finding Rh antibodies in the Rh-negative wife of an Rh-positive man. Occasionally Rh antibodies may even be found in an Rh-positive woman whose Rh type differs from her husband's. Such finding will warn the obstetrician to be on his guard at the time of the child's birth. If any evidence of fetal erythroblastosis is found, especially anemia, immediate therapy with Rh-negative blood transfusion may be instituted without any loss of time. Experience has shown that the speed with which therapy is instituted is frequently a deciding factor in the success.

It is essential to know the Rh factor of any woman, especially if pregnant, in order to have available suitable blood in case a transfusion is needed.

There is no possible disadvantage in Rh testing. It is good to keep in mind that finding of an Rh-negative factor in the mother and an Rh-positive factor in the father does not mean that the child will necessarily be afflicted with the disease. Only in a relatively small number of such marriages are the children afflicted. Furthermore, the first child is almost always well, unless the mother had a transfusion of Rh-positive blood prior to pregnancy.

The present consensus is that Rh testing should be a routine antepartum test.

INFECTIOUS LYMPHOCYTOSIS AND LYMPHOCYTIC LEUKEMIA

To the Editor:—Please discuss the differential diagnosis between acute infectious lymphocytosis and chronic lymphocytic leukemia, with emphasis on hematologic differences and findings on physical examination.

Lieutenant, M. C., A. U. S.

ANSWER.—Acute infectious lymphocytosis is mainly a disease of children, although a few cases have been observed in young adults. The clinical symptoms are extremely mild and there is usually no adenopathy or splenomegaly. The white blood cell count rises rapidly sometimes to as high as 100,000, with a high percentage of mature lymphocytes. The red cells and platelets are unaffected. After a few weeks the white blood cell count begins to go down and the blood picture returns to normal within three to seven weeks.

Chronic lymphatic leukemia is practically unknown in children. There is a slow and progressive rise in the white cells, which are predominantly mature lymphocytes. Slight anemia and thrombopenia are common. The bone marrow shows a greater degree of lymphopoiesis than is present in infectious lymphocytosis. As the leukemia progresses, the lymph glands and spleen enlarge.

It is not possible to distinguish chronic lymphatic leukemia from infectious lymphocytosis by the examination of a single blood film. However, the clinical course readily differentiates these two conditions.

DERMATITIS AND FIVE CENT COIN

To the Editor:—A patient has a dermatitis around the hairline of both temples. The allegation has been advanced that this dermatitis is a dermatitis venenata due to a new substance or metal added to the five cent coin during the war. It is further rumored that the government tried to recall all these coins because of this factor. Is this true?

M.D., Michigan.

ANSWER.—The regular composition of the five cent coin before the war was 25 per cent nickel and 75 per cent of copper. During the war the composition was changed to 35 per cent silver, 9 per cent manganese and 56 per cent copper. Since Jan. 1, 1946 the composition has been the same as it was before the war, namely 25 per cent nickel and 75 per cent copper.

In answer to a direct inquiry, the Department of the Mint stated that there were no cases of dermatitis caused by the wartime nickel, nor were any nickels recalled.

In a case of dermatitis around the hairline of both temples, spectacle frames made either of alloys or of plastics are to be suspected. The most common metal in an alloy causing sensitization dermatitis is nickel. Any incompletely cured or polymerized plastic is capable of causing sensitization dermatitis.

VITAMIN K DOSAGES

To the Editor:—In Queries and Minor Notes (The Journal, Dec. 7, 1946, p. 893) there was a discussion of the dosage of vitamin K in the prevention of hemorrhagic disease in the newborn. A pertinent fact which was not mentioned prompts me to write that the various vitamin K preparations available on the market do not exhibit the same vitamin K activity. To illustrate, 1 mg. of menadione, according to the definition of the methyl-naphthoquinone (MeNQ) unit, is equivalent to 1,000 such units. However, 1 mg. of Hykinone (menadione sodium bisulfite) contains only 625 MeNQ units (Gutman: Modern Drug Encyclopedia, ed. 3, p 365) and an equal weight of Synkayvite (2-methyl-1, 4-naphthohydroquinone diphosphoricester tetrasodium salt) yields even less, namely 490 MeNQ units (Almquist, H. J.: *Physiol. Rev.* 21: 194 [Jan.] 1941). The Journal quotes 2 mg. of menadione as a dosage level. This is equivalent to 4.08 mg. of Synkayvite. The activity of the particular preparation being used should be known. In converting vitamin K compounds from insoluble to water soluble forms, the molecular weight is increased. All vitamin K compounds should be compared with menadione on a molecular and not on a weight basis, and for uniformity and simplicity it is suggested on the basis of biologic vitamin K units.

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